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EDITED BY
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AND

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S'il est possible de perfectionner l'espèce
humaine, c'est dans la médecine qu'il faut
en chercher les moyens.

—DESCARTES

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Fig. 1, Case I. Fold at edge of tumor.



Fig. 2, Case I. do. tumor

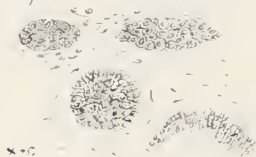


Fig. 3

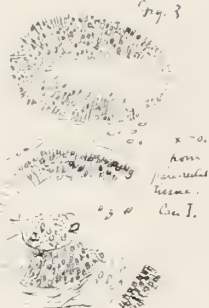


Fig. 4, Case V. From deep portion of tumor



Fig. 5 Case II

x 150

from lymphatic gland



Fig. 6, Case II.

x 150.

from lymphatic gland.

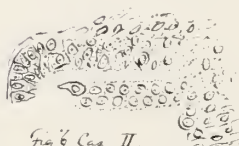


Fig. 7, Case II.
from lymphatic gland
2 cm. above tumor.



Fig. 8, Case III. Horizontal section
from surface of tumor.

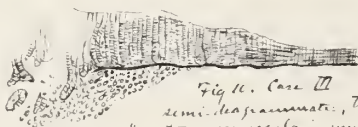


Fig. 10, Case III.
semi-diagrammatic, to show
persistence of muscularis mucosae
to edge of tumor, and round cell
infiltration of submucous tissue.



Fig. 11 Case III
from center of tumor
x 8.

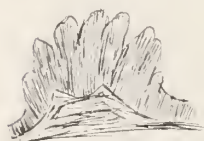


Fig. 9, Case III.



Fig. 12 Case III
Dissociation of muscle.

Adenomatoid

ARCHIVES OF MEDICINE.

Original Articles.

A CONTRIBUTION TO THE STUDY OF CANCER OF THE RECTUM,

BY LEWIS A. STIMSON, M. D.,
SURGEON TO THE PRESBYTERIAN HOSPITAL.

IN the number for March 13, 1878, of his *Klinische Vorträge*, Volkmann published an article upon extirpation of the rectum for cancer, which was noticed in many journals and received much attention. The author claimed that the thorough removal of the cancerous tissue would effect a complete cure, or would at least be followed by a return of the disease only after the lapse of a long period, six or eight years in some cases, and also that the use of antiseptic precautions made this thorough removal a comparatively safe operation even when carried to the extent of opening the peritoneal cavity in the wound. His record of results bore out his statements, and his cases were so numerous that the reader might easily receive the impression that the author had operated upon most of the cases that presented themselves, and overlook the briefly stated opinion near the end of the paper, that it is comparatively seldom that an operation is justifiable.

In July, 1878, Prof. Van Buren published the notes of four cases in which he had advised removal by Volkmann's

method, in the *N. Y. Medical Record*, "as a contribution towards the better knowledge of the proceeding, simply as regards its feasibility and safety; for its value as a remedy we must await results." Since this publication four additional operations in three new cases and in one of the old ones have come under my observation, which, with the subsequent history of the others and the microscopical examination of the specimens, throw some light upon the natural history of the disease and upon the facts which must determine the propriety of interfering actively, and the choice of an operation.

Removal of a cancer of the rectum is by no means a new operation, but, as heretofore practiced, it has proved a dangerous one, even when the tumor was small. The records of the operation show that the fatal issue is most frequently due to a diffuse, rapidly advancing septic inflammation of the para-rectal and retro-peritoneal connective tissue, extending sometimes in a few hours even to the diaphragm, and frequently associated with septic peritonitis. Volkmann sought to meet this danger, which seemed to have its origin in the retention and decomposition of the secretions, by thorough drainage through side channels established for the purpose, and by the use of not only the ordinary antiseptic measures but also that of antiseptic irrigation maintained for several days after the operation.

The success that has attended these measures proves it to be safe and possible, he claims, to remove the diseased parts much more thoroughly than has heretofore been attempted, and this thoroughness of removal has the great advantage of delaying the return of the disease and even in some cases of effecting a permanent cure. The extent to which he safely carried this removal is far in advance of anything that was done under the earlier methods, both in the length of the portion of the rectum and in the amount

of infiltrated connective tissue removed. The peritoneum even was opened in eight cases, all of which recovered.

The importance of any method that allows of the safe and thorough removal of cancerous portions of the rectum is relatively increased by the limited range and unsatisfactory character of the therapeutical alternatives, which, leaving a radical cure entirely aside, go no further than the establishment of an artificial anus in the hope of retarding the growth of the tumor and diminishing the pain, or may even be limited to keeping open a passage by scraping away the obstructing nodules and granulations or by the frequently repeated painful use of bougies. It has been amply shown that removal may, under certain circumstances, be followed by a permanent arrest of the disease, or at least by a period of freedom from any of its manifestations sufficiently prolonged to justify the interference. But it is equally certain that in other cases the progress of the disease has been rendered only more rapid by the interference, and that the relief from pain, the only advantage derived by the patient from the operation, might have been obtained more easily and effectually in some other manner. The important point therefore, the one to which our investigations should now be directed, is to learn to distinguish between tumors that are suitable for removal and those which are not. Operative surgery has provided for the proper treatment of both varieties; we can safely and effectually remove the former, and by opening the colon in the groin or in the loin we can meet the symptomatic indications of the latter; it remains to know when to attempt a cure, and when to stop at alleviation.

It is natural in seeking the answer to this question, to turn first to the anatomical structure of the tumors, and see if there are any histological differences which correspond with, even if they do not explain, the differences in prog-

nosis. It is only too often the case that this line of investigation leads to results that have but a limited practical bearing because of the difficulty of applying them to a given case at that period in its treatment when the application can alone be of use. Their greatest value is to be found in the means they afford of classifying clinical facts in such manner that more positive conclusions can be early drawn from them, and in bringing to light the natural history and tendency of the morbid growths. Clinicians and histologists have found in the rectum most of the varieties of tumors found elsewhere in the body, and there is no good reason for calling in question the accuracy of their examinations and descriptions, although it may be doubted if many of the varieties do not differ from one another rather in degree or mode of development than in their essential nature. With perhaps one exception, the morbid growths in the cases here considered belong in the class to which the name of cylindrical-celled epithelioma is given. The possible exception belongs to the variety known as colloid cancer, and although my examination was less thorough than I could have wished, I believe its origin to have been the same as that of the others. Some of the tumors showed individually at different points appearances which have been described as characteristic of radical differences in structure and nature; and, taken altogether, they present a complete series of gradations between what is described as polyp on the one hand and scirrhus or true carcinoma on the other. The enlarged and lengthened tubules of the mucous membrane, growing outwards into the lumen of the bowel, and showing no tendency to invade the underlying tissues, are found side by side with other similar tubules extending downwards into and through the muscular tunic, and reappearing in typical form in distant lymphatic glands. And in the deeper parts these tubes and their epithelial lining

undergo a series of changes in size, arrangement and shape (Figs. 2, 3, 4, 7, 11), which ends in the production of a tissue composed of small alveoli filled with irregularly globular epithelial cells and separated from each other by a fibrous stroma, a tissue having the appearance of true carcinoma.

There is no fundamental difference in the anatomical elements of these tumors to explain the difference in the results of the operations, but the tendency to local return seems to have depended entirely upon the extent to which the disease had involved the muscular coat of the intestine and the adjoining tissues. Only five of the eight cases here mentioned bear directly upon the question of return, for the remaining three died in consequence of the first operation upon them. The disease returned locally in three of these cases; the other two have remained free from it for periods of nine and thirteen months respectively. In all five cases the prominent anatomical characteristic of the tumors was the presence of tubules of irregular size and shape, lined with cylindrical epithelium. In the two successful cases the morbid tissue did not extend through the underlying thickened muscular coat of the intestine; even at the central, thickest part it was still distinctly limited by a layer of unstriped muscle. In the other three cases, on the contrary, the muscular coat was broken through, either largely or by a sort of perforation along the line of the blood-vessels; the adjoining connective tissue was condensed and hardened, and the lymphatic glands were enlarged and contained typical cylindrical epithelial formations. This implication of the para-rectal connective tissue and glands was noticeable not only in these three cases, but especially so in the cases in which the operation had a promptly fatal result. In these latter, and in one of the others (Case V), it was so extensive that a complete removal of the affected tissue was impossible, and it rendered

it difficult to bring down the upper end of the rectum sufficiently to attach it to the margin of the external incision without undue tension.

The three cases (Cases I, II, V) showed very plainly the part taken by the connective tissue, or the lymphatic glands, in the local return of the disease. In two of them (Cases I and II) the disease was found to have returned, on examination about seven months after the operation, in glands lying outside of and adherent to the rectum. In Case I the gland was removed through an incision made along the side of the coccyx and sacrum, and showed on examination tubules lined with cylindrical epithelium. A second return occurred in this case a few months afterwards. In Case V the stitches uniting the upper end of the rectum to the skin tore out and the gut retracted, leaving an annular raw surface from three to five centimetres in breadth to heal by granulation. A month after the operation, firm, hard nodules were found scattered over this surface, and these nodules which, although not examined microscopically, were undoubtedly cancerous, increased until their mass almost completely filled the excavation.

The mucous membrane limiting these tumors exhibits changes which clearly show their mode of lateral growth or extension (Fig. 10.) The tubes at an average distance of perhaps five millimetres from the edge of the tumor begin to lengthen and increase in diameter. Their epithelium shares to a variable degree in this hypertrophy, and sometimes the cells are distended by a clear, highly refracting, mucus-like substance. This enlargement increases steadily as the edge of the tumor is approached, and young embryonal cells are found in increasing numbers in the corresponding portion of the submucous layer of connective tissue. The thin layer of unstriped muscle lying between the tubes and the submucous connective tissue, the muscu-

laris mucosæ, persists apparently unchanged to the edge of the tumor; and at the point where it disappears the hypertrophied tubes take a sudden extension downwards into the thickened underlying layer of soft, young, embryonal cells, become irregular and branched, and their epithelium small and dark, with a tendency to become more globular and less cylindrical.

The normally scanty connective tissue between the tubes shares in the general hyperplasia, and merges with that of the submucous layer. When the surface ulcerates this tissue undertakes as usual the work of repair, and produces masses of granulations, in which the epithelial formations are found scattered at irregular intervals.

Under some unknown conditions the muscularis mucosæ persists, becomes thickened, and is reinforced by the development into fully formed connective tissue of the embryonal cells of the submucous layer. The overgrowth of the mucous membrane, and the retraction of the submucous layer, like that of a cicatrix, throw the former into a fold (Fig. 1), or, if only a restricted area is thus involved, into a polyp. This tendency to the formation of a projecting ridge or fold, is, of course, most marked at the border of the tumor, and is strengthened by inflammatory thickening of the para-rectal connective tissue, which, by preventing distention of the bowel, and maintaining its normal folds, favors the retention by the morbid growth of the normal form of the parts.

It is not uncommon also to find the morbid tissue extending laterally at some points on the margin along the submucous layer, under the unbroken muscularis mucosæ. Such points appear as firm rounded ridges covered with mucous membrane which to the touch and eye appears unaltered, except in being rather more coarsely velvety than is natural. The section of these ridges shows very plainly

a thickened mucosa resting upon an opaque white or yellowish mass, which itself lies upon, or is superficial to, the muscular tunic, and is continuous with the main body of the tumor, and identical with it in structure. This extension laterally along the submucous layer is in accordance with the well-known tendency of morbid epithelial growths to spread into softened proliferating connective tissue, or along what may be considered lines of least resistance.

The muscular coat of the intestine dips downward at the margin of the tumor, and extends under it in an unbroken line in the earlier or less developed stages of the affection. In the later stages its continuity is broken, and its identity as a layer lost, by union with the thickened para-rectal tissue and infiltration by the epithelial formations. It is always thickened by increase of its muscular and connective tissue elements. In some cases the muscular fibres are separated into small bundles by wavy bands of fibrillary tissue; in other cases the routes of the perforating vessels are marked by rapid and abundant proliferation of the cells of the accompanying connective tissue, a proliferation which prepares the way for the spread of the epithelial growths in the same direction.

The condition of the para-rectal connective tissue depends upon the depth to which the tumor has penetrated, and upon its extension laterally around the interior of the bowel. If the muscular tunic is unbroken, the thickening of the outer connective tissue is mainly confined to an area corresponding sensibly to the central or thickest part of the tumor, and it seems to be due entirely to a chronic inflammatory process set up and maintained by the adjoining morbid change, and not to specific infection or infiltration. If, on the other hand, the muscular coat is broken, the adjoining tissue furnishes a favorable nidus for the spread of the disease; it thickens rapidly in all directions, and the lym-

phatic glands imbedded in it enlarge, harden, and become the seat of secondary epithelial deposits (Fig. 7). It is not probable that this infection is delayed until after the muscular tunic has been plainly broken through; the process is more likely to be a gradual and contemporaneous one, the infection and the perforation taking place along the line of the vessels as above described; but it is certainly slow in the beginning, and takes its first rapid strides outside along the lines of the lymphatics only after the muscular barrier has been effectually broken down. The corresponding resistance to the spread of the affection offered by the thinner and weaker muscularis mucosæ has already been mentioned.

In examining the masses removed by operation, I have found enlarged and diseased glands at a distance of more than 5 cm. from the point at which the muscular coat had been perforated. In all such cases which survived the operation, the disease, as I have already stated, recurred locally, and there is no reason to think that removal sufficiently complete to effect a permanent cure is practicable when the disease has progressed to such an extent.

When the tumor involves a more or less annular segment of the bowel, and presents a notable obstacle to the passage of the fæces, the thickening of the para-rectal tissues is increased by the mechanical violence inflicted upon the parts, and by the forcing downwards of the narrowed segment during the act of defecation. The use of bougies to enlarge the opening probably has the same effect, because dilation can be effected only by the rupture or stretching of the rigid fibres whose natural (cicatrical) retraction has been the cause of the narrowing. Each such act of violence excites a fresh proliferation, and thus hastens the progress of the disease.

The clinical history of this affection is not as complete as

could be desired, because an opportunity to observe its beginning is seldom given. In two of the cases here recorded (Cases III and VII), the patients came under observation at an early period. In each case the medical attendant detected a polyp which had given rise to some bleeding, and removed it more or less completely. A second examination in each case, after the lapse of about eighteen months, disclosed an unmistakable epithelioma. In Case I there was a history of "ulcerated hæmorrhoids," which had been frequently cauterized and snipped off. In all the others the tumor was found on the first examination, and the antecedent history was only that of more or less obscure rectal trouble and bloody stools.

The fully-developed tumors were found on digital examination to be hard lumpy or tuberculated masses, ulcerated at one or more points, sometimes with elevated well-defined borders, and sometimes shading off as a granular or coarsely velvety mucosa. Usually they surrounded the bowel entirely, or nearly so, and appeared in all cases to have begun upon its posterior surface. The tumor was, in some cases, continuous with the anus; in others, separated from it by a strip of mucous membrane of varying width. In every case the upper margin of the tumor was within reach of the finger. The ulcerated surface was elevated and covered with granulations, except in Case VIII, where it was deeply excavated. The ages of the patients were 30, 33, 36, 40, 42, 50, 50, and 64 years. In the youngest and the oldest, treatment was most successful. Four were males, four females.

The extent of para-rectal thickening is not easily estimated by the finger, and mobility of the tumor is not a trustworthy indication, because it may coexist with an amount of thickening and infiltration which renders complete removal impracticable. The duration of the affection

also throws no light upon this point, because the date of its beginning can seldom be determined. In the two cases in which the disease began as a polyp, the period between the recognition of the polyp and that of the fully-developed tumor was about eighteen months. It is evident, however, from the results of the microscopical examination given above, that the determination of the amount of thickening is vital to the question of treatment, because it is a measure of the extent of lymphatic infiltration or infection, and, of the probability of local return or generalization.

If the record of these cases is examined with reference to this point, it appears that the para-rectal tissue was extensively involved whenever the calibre of the rectum was so narrowed circularly as to offer a distinct obstacle to defecation. In the only case of this kind which survived the operation (Case V), the disease returned locally before the wound had healed. In another case (Case II), where there was circular implication of the bowel, but no noteworthy narrowing, a large hard lump, not adherent to the mucous membrane, was distinctly felt and included in the ligatures by which the affected zone was removed. The disease returned immediately in the cicatrix, and when a second removal was made by the knife, six weeks after the first, the connective tissue and some lymphatic glands were distinctly involved, as the microscope proved. In the two cases in which the disease has not recurred (Cases III and VII), it existed as one or more elevated patches with a granulating surface; the elevation of the patch in Case VII was such as to almost give it the appearance of a sessile growth.

These facts seem to establish two extremes: 1st, that narrowing of the bowel sufficient to be a distinct obstacle to the passage of the fæces is accompanied by implication of the deeper tissues to an extent which renders prompt

local return of the disease certain; and 2d, that when the disease exists as a circumscribed raised patch with an exuberantly granulating surface its removal may effect a radical cure. Between these two extremes there must exist a series of gradations, in the great majority of which, however, the disease will return ultimately, the differences lying in the activity of the recidive and the length of the period during which the patient will remain free from it. Return after free removal occurs first in the para-rectal connective tissue and involves the bowel only secondarily, in Case II only after the formation of abscesses which burst into the rectum.

If now upon these anatomical and clinical data we attempt to construct a theory of the character and development of the disease, we must regard it as one which, beginning as a simple local affection of the mucous membrane, progressively involves the underlying tissues, and ends in generalization through the lymphatic system. The fact that most of the tumors apparently began upon the posterior wall of the rectum about two inches above the anus makes a local constant cause probable, and points to some action upon the mucous membrane by the fæces, a mechanical action due to their arrest and pressure there, aided perhaps by some irritant change in their constitution.

It does not lie within the proposed scope of this paper to discuss the question whether cancer is primarily a local or a constitutional affection. The explanation of the local appearance of the disease and of its local return after removal, given by Sir James Paget, who is perhaps the most prominent upholder of the constitutional theory, is so far in accord with that offered by those who hold to the local theory as to render the discussion, in my judgment, mainly one of terms and definitions. If it is admitted that cancer of the rectum is essentially a glandular or epithelial affec-

tion, one having its origin in the mucous membrane, the borders of the growth, as being the freshest, most recent portions, must be examined, as in carcinoma of other organs, for evidences of primary changes and mode of development. These changes have been already described. They consist of hypertrophy of the mucosa by hypertrophy and hyperplasia of its epithelial elements, together with an abundant development of embryonal connective tissue between the tubules. They are the same as those found in a variety of neoplasm of recognized benign character known as polyp of the rectum or polypoid adenoma. The formation of a pedunculated growth with a tendency to isolation in the one case, and of a flat growth with a tendency to spread laterally and into the underlying tissues in the other, may be explained partly by mechanical causes and partly by the degree of intensity of the changes in the submucous connective tissue. If the primary change occupies a limited area upon a natural fold of the mucous membrane, and if the muscularis mucosæ remains unbroken until the young embryonal cells produced below it, in consequence of the neighboring irritation, have had time to develop into adult fibrous tissue, the natural retraction of this new tissue narrows the base of the fold, giving it at once a polypoid form and opposing by its greater density a stronger barrier to the extension of the epithelial formation in this direction. The pedicle once formed, the neoplasm increases in the directions open to it, that is, into the lumen of the canal in all its diameters, and the dragging to which it is subjected by the constantly recurring passage of the fæces lengthens its pedicle and tends towards its final separation.

On the other hand if a broader area is occupied by the primary change, or if the processes are more intense and rapid, the pedunculation is absent or less perfect, and the epithelial growths of the mucosa break through immediately,

or after an interval spent in overcoming the greater resistance offered by the partial pedunculation, into the submucous tissue. Once established in that region the spread of the disease is easy, and its ultimate generalization a question only of time.

The second and final barrier to generalization is presented by the muscular coat of the intestine, but it is a barrier in which are many gaps, large ones along the lines of the vessels, and innumerable small ones in the fine meshes of connective tissue which separate the muscular bundles and are continuous with the submucous tissue on one side and the para-rectal tissue on the other. Here, too, the intensity of the process materially affects the rapidity of its extension, for if the proliferating connective tissue, which is most easily implicated while it is in the formative stage, is allowed time to reach its full development, to become fibrous, it forms, as it were, a second line of defense capable of offering a certain resistance after the first line has been carried.

In the relative predominance of the production of connective tissue over that of the epithelial formations which are imbedded in it, lies the explanation of a fact observed in the two successful cases here recorded (Cases III and VII), and perhaps also of their less degree of malignancy. In both cases the ulcerated surface was covered with exuberant granulations containing very few tubules, and forming masses or lumps which in one case were broken off in considerable quantities during the operation. The predominance of granulation tissue in these detached pieces was so great that repeated examinations of some of them failed to show any tubules. The surface from which they came was very vascular, the vessels consisting of large, thin-walled, freely-inosculating, thickly placed capillaries. In a word, the surface was that of an ordinary granulating ulcer, and

the granulations had their origin in the stroma of the tumor. It seems reasonable to suppose that this tendency to more vigorous production of connective tissue, as compared with the epithelial elements, near the surface, existed also in the deeper parts, and aided in the manner above described to delay the cancerous implication of the para-rectal tissue.

I have used the terms *cancer* and *cancerous* in speaking of these tumors and different processes observed in them, because I believe them to belong to a connected series of morbid changes, the ultimate term of which presents characteristics, anatomical and clinical, the idea of which is generally accepted as attaching to those terms. Even if this belief should be erroneous, the error would not, I think, affect the following clinical deductions.

TREATMENT.—In estimating the advantages of treatment, the probable comfort of the patient and the period of his survival in case of non-interference, must be taken into account. The present cases afford no positive data upon the latter point, but the degree of cachexia, of functional disturbance, and of pain in all except Case II, was such that a prolongation of life for twelve months after they first came under observation was improbable. In another case, not included in this paper, which came under my care about three months ago, and was not considered suitable for operation, the patient, himself a physician, first noticed the symptoms of the disease in August, 1878, and he died in May, 1879.

Comparing this prognosis with the results of active interference, we find that in four cases death followed within ten days after, and as the result of, the operation. In one of these cases a chill, supposed at the time to be malarial, but which was possibly pyæmic, occurred the day before the operation. In two others the patients' general condi-

tion was very bad, and the disease very extensive. In the remaining case the patient had previously undergone two operations, the first twenty months, the second ten months before, and was much exhausted by pain and suppuration. Of the seven survivals after operation (representing five patients) two patients have remained entirely well and free from any return of the disease for thirteen and nine months respectively, and one patient died six months afterwards in consequence of prompt local return and rapid progress of the disease. One patient (Case II) underwent a second operation two months after the first, and on examination eight months afterwards the disease was found to have returned again; during the six months that have elapsed since that examination, it has progressed rapidly, and another attempt at removal is not considered justifiable. The remaining patient (Case I), improved greatly in health after his first operation. His second operation was performed a year after the first, and consisted in the removal of an affected lymphatic gland by an incision not involving the anus or rectum. His third operation was performed ten months after the second, and is included above among the fatal ones.

The *Lister method* was employed in five of the eleven operations; one of these (Case VI) died of peritonitis. Carbolic acid, without the spray, was used freely in three cases (I, IV and VIII); all died, one of pyæmia, one of exhaustion, and the third of exhaustion, after passing through an attack of peritonitis.

Removal of the entire cylinder, including the anus (the latter being a precaution recommended by Volkmann to diminish the chances of return), was done in five cases (I, III, IV, V and VI). One has remained well, one had local return of the disease, three died of the operation.

Removal of the entire cylinder, not including the anus, was

done three times in two cases (II and VIII), twice by the knife, once by ligature. In the latter case the disease returned immediately, before the wound had healed; one died of the operation, and in the other the disease returned in eight months.

Removal of only the affected portion, not including the entire circumference of the bowel, was done in two cases (I, VII). In one (removal by the *écraseur*) local return was detected in seven months; the other has remained well for nine months, as has been proved by several examinations.

These cases are too few and too varied in their treatment to allow of any very positive formulation of therapeutical principles upon them, nor is that the object of this paper, which is intended rather as a simple contribution to the study of the subject. Nevertheless, a few conclusions may be fairly drawn.

The first one is, that Volkmann's enthusiastic presentation of the advantages of extirpation of the rectum under antiseptic precautions is calculated to mislead surgeons, by inducing them to undertake it under circumstances which ought to clearly contra-indicate it. For, while the use of carbolic acid and drainage has notably lessened the dangers of the operation, it is far from guaranteeing patients, especially the feeble and cachectic, from death by shock, peritonitis, or exhaustion; and when the infiltration of the para-rectal tissues is extensive, one of two things will probably happen: either the patients will have become so reduced by functional disturbances, and the establishment of a constitutional infection, that they will be unable to meet the demands of the process of repair; or, secondly, the upper segment of the bowel will have become so adherent to the sacrum that it cannot be brought down to complete the operation properly by stitching it to the skin or lower segment, and the disease will return promptly in the wound.

When the disease involves the bowel circularly, and has been the cause of difficult and painful defecation for several months, and if the ulcerated surface is excavated, it may be considered certain that the connective tissue and glands are extensively involved. Under such circumstances, an attempt to remove the tumor radically must be unsuccessful, and if any operation is called for it should be a palliative one, such as the establishment of an artificial anus in the groin or loin.

On the other hand, tumors involving only a portion of the circumference of the bowel, with raised, well-defined borders, and a flat or lumpy, broadly-ulcerated, easily-bleeding surface, are slow to implicate the para-rectal tissue, and are, therefore, the most favorable cases for radical cure by removal.

Between these two extremes lie the cases in which, while it is probable the patient will recover from a well-conducted operation, it is certain that if he should do so, the disease will return in a few months in the tissues outside the rectum. The relief of the patient during this period is so complete, and the progress of the disease so far delayed, that it is justifiable to undertake the operation with the sole object of obtaining these two results. In the milder cases of this series, the operation holds out in addition the chance of an extirpation possibly so complete as to result in a radical cure; while in the severer cases the preferences of the patient, his mental condition, and his material surroundings must be taken into account in determining whether to attempt extirpation or to be content with colotomy.

Another deduction is, that not only is nothing to be gained by removing the anus when that is not involved, but also that is not even necessary to remove a circular segment of the bowel when the tumor occupies only a portion of the circumference. A so-called "partial" removal can

be done as thoroughly as a "complete" removal, if division of the sphincter and bowel below the tumor is made the first step in the operation, and easy access to the underlying tissues thereby obtained. And yet it must be remembered that the disability produced by removal of the sphincter is not of much practical moment, and certainly not greater than that due to delayed and imperfect repair after its division.

And, finally, remembering the insidious growth of the disease, its amenability to treatment in its early stages, and its absolute lethality in the later ones, the physician should be always on the alert for the earliest indications of its presence, and should not allow himself to be soothed into fancied security by the community between its symptoms and those of other and much less serious affections. A polyp or polypoid growth discovered in the rectum of an adult should be looked upon as a possible, the latter even as a probable, starting-point of carcinoma, and it should be immediately removed, and removed thoroughly. It may be proper to remove with the *écraseur* a polyp that has a long thin pedicle, but when the growth is at all sessile and hard, the only safe course is to remove by a formal operation all the tunics of the bowel with it.

METHODS OF OPERATION.—1st. In the operation of total extirpation, the rectum having been thoroughly emptied, an incision is made around the anus at a distance of one or two centimetres from its margin, and then extended posteriorly in the median line towards the coccyx. By cutting with the knife or scissors, and tearing with the fingers, the surgeon makes his way upward outside the bowel, separating it entirely from the adjacent tissues to a point somewhat above the upper margin of the growth. If the rectum above this point is found so adherent that it cannot be easily brought down, its attachments must be still further

torn or cut until it is sufficiently liberated. All the lower portion, including the tumor, is then cut away, all thickened masses of connective tissue removed, and the edge of the bowel stitched fast to that of the skin. Drainage tubes are passed well up into the excavation on each side and behind, and brought out through the posterior incision, or through separate openings made in the skin for this purpose. It is well to place a rubber bag or ball in the rectum and inflate it so as to distend the rectum, and thus diminish the vacant space created around it by the dissection. Or, if the full Lister method is employed, a pouch of antiseptic gauze should be pressed up into the bowel and filled with plugs of the same material.

2d. When a strip of healthy mucous membrane lies between the tumor and the anus, and the latter is not to be removed, the sphincter should first be forcibly dilated, and then divided posteriorly in the median line towards or to the coccyx, and the incision prolonged up the bowel to the lower margin of the tumor. A corresponding incision may also be made anteriorly if absolutely required. The bowel is then divided transversely throughout its entire circumference below the tumor, and the operation proceeded with as in the former case, the end of the upper segment of the bowel being finally attached to that of the lower with silk sutures, and drainage entirely external to the rectum and anus provided for.

3d. When the tumor involves only a portion of the circumference of the bowel, and a complete ring or cylinder is not to be removed, the operation is begun as in the second case, and then, starting from the upper end of the incision, the involved portion of the bowel is separated from the underlying parts by tearing and cutting, and the incision is prolonged around the tumor at the distance of one centimetre from it until it has been entirely encircled and removed. If

the gap left is a small one, its sides may be sutured together longitudinally, but if it is a large one, the line of reunion should be crucial, the four corners at the crossing being held together by a stout silk ligature, embracing the entire thickness of the bowel. This ligature, like the others, may be left to cut itself out. Drainage must be as carefully provided for in this case as in the others, and in the same manner.

4th. Colotomy, as has been pointed out, may be employed as a palliative measure against pain, and also with advantage, I am inclined to believe, to retard the progress of the disease in case of its return in the tissues outside the bowel after extirpation. The operation in the left loin, lumbar colotomy, is now the method usually employed, but there are reasons why the other method, opening of the sigmoid flexure in the left groin, may be preferred. The latter method, which is generally known as Littré's operation, is free from some difficulties and chances of failure pertaining to the other, and the objection most strongly urged against it, that of having to open the peritoneum, has been shown by experience to be much less formidable than has been supposed. Its advantages are its ease of execution and the certainty with which the colon can be reached and opened. According to recent statistics, its mortality is not greater than that of lumbar colotomy. In lumbar colotomy the incision has to be carried through a much greater thickness of tissue, and the absence of landmarks is such that even surgeons of considerable experience in the operation have cut into the peritoneum accidentally, or have brought up and opened a loop of small intestine instead of the colon, and have discovered the mistake only at the autopsy.

CASES.*

CASE I, under the care of Dr. Keyes.

J. E.—, 50, a pale, thin, haggard man presented himself April, 1877, with complaint of constant leakage of pus from the anus, and great pain, especially after stool when there is also blood. He gave a history of "ulcerated hæmorrhoids" which had been frequently cauterized and snipped off. On examination a hard mass was felt about five centimetres above the anus, attached posteriorly, and involving from half to three quarters of the circumference of the rectum. The mass was slightly pedimentated and cauliflower-like; it projected into the cavity of the bowel and involved the tissues between it and the sacrum, without being adherent to the latter. It was most bulky in the centre where it was ulcerated, and tapered off on both sides.

1st operation, May 1. 1877.—The tumor was removed by first dividing it, the sphincter, and the skin back to the coccyx by means of the *écraseur*, and then removing each half of the affected tissues by encircling them successively with the wire of the same instrument. No antiseptics were used, the hemorrhage was slight. The growth was pronounced on microscopical examination to be a cylindrical-celled epithelioma. The patient made a good recovery and went home in about six weeks.

2d operation.—He returned six months afterwards considering himself cured, and reporting a gain of twenty pounds in weight. On examination a smooth hard lump as large as a walnut was felt just above the cicatrix, firmly adherent to the sacrum but entirely outside of and not involving the bowel. It was removed February, 1878, through an incision made along the right side of the sacrum and coccyx without cutting into the bowel. The patient recovered rather slowly.

3d operation.—He returned to the city, December, 1878, thin and haggard, with constant dribbling of blood and mucus from the anus, and complaint of pain in the rectum and back. A cauliflower-like growth occupied the cicatrix of the first operation and the bowel for some distance above it; the tissues between it and the sacrum were hard and infiltrated. Encouraged by his success in Cases II and III, Dr. Keyes determined to try complete extirpation of the anus and cylinder of the rectum to the height occu-

* Portions of the record of the first four cases were published by Dr. Van Buren, in the *N. Y. Medical Record*, July 13, 1878.

pied by the tumor, but he found himself unable to liberate and bring down the upper portion of the bowel or to remove all the infiltrated connective tissue, the upper limit of which was out of reach. He used carbolic acid freely to wash out the wound, but did not use the spray. The patient died of exhaustion within a week, no autopsy.

The nodule removed at the second operation was composed of irregular tubules lined with cylindrical and irregular epithelium imbedded in a connective tissue stroma.

The mass removed at the third operation shows an ulcerated surface about two centimetres in diameter, adjoining which on one side is a thickened fold one and a-half centimetres high and thick. The mucous membrane is velvety and injected. Vertical section through the fold shows a central stroma continuous with the muscular coat and lined by a manifold thickened mucous membrane shading off on the outer side to the slightly thickened mucous membrane of the adjoining surface, (Fig. 1). The surface of a vertical section through the ulcer is of an opaque, yellowish-white color, and of homogeneous appearance to the naked eye. Microscopical examination shows in the thickened mucosa of the fold irregular tubes lined with cylindrical epithelium; and under the ulcer the same tubes modified in size, shape, and character of the lining cells as described more fully in Cases II, III and V. The tubes show the same tendency here to become smaller and lose their central cavity, their epithelium becoming at the same time more globular and less cylindrical; and they are found side by side with groups of small alveoli occupied by irregularly globular epithelium, and separated from one another by a connective tissue stroma. (Fig. 2.) The strips of infiltrated para-rectal connective tissue show in places perfectly characteristic cylindrical-cell formations apparently not developed in lymphatic glands (Fig. 3.); and also some enlarged lymphatic glands presenting the same appearances.

CASE II, under the care of Drs. Van Buren and Keyes.

Mrs. L.—, a large, well-nourished lady about 40 years old, presented herself with a history of obscure pain or discomfort in the rectum which had been supposed to be due to malposition of the uterus. Examination of the rectum revealed a movable zone of lumpy thickening nearly surrounding the bowel at about five centimetres from the anus. This was removed March 10, 1878, by pinching it up in a transverse fold or tuck and transfixing the base of the fold with a continuous series of ligatures. The slough

came away in ten days and presented on examination the appearance of cylindrical-celled epithelioma, with a very abundant development of young connective tissue cells in a thick hard mass which underlay the zone at the posterior portion of the rectum. A month after the operation the wound was found cicatrized, except at one point on the posterior surface where a characteristic nodular growth showed the disease to be still active.

2d operation. On May 1, 1878, a zone of the bowel including this nodule and the cicatrix but not the sphincter was removed by operation according to the second method described above (page 20) with all the antiseptic precautions recommended by Volkmann. A mass of thickened connective tissue and fat occupying the concavity of the sacrum and extending four or five centimetres above the seat of the disease in the bowel was also removed. The patient made a good recovery, and on June 12th she visited Dr. Van Buren's office: he found, on examination, "that the wound was cicatrizing satisfactorily: about three-fourths of an inch within, the finger passed easily through a thread-like ring, marking the contracted end of the gut: beyond this, as far as the finger could reach, everything was soft and healthy."

On examination eight months after the operation a small nodule of stony hardness was felt about three centimetres above the anus in the tissues behind the bowel. Two months later three nodules were found, each as large as the end of the thumb, and together forming a mass which was firmly adherent to the sacrum within easy reach of the finger. The mucous membrane covering it was smooth, adherent, and apparently normal. The patient looked a little dragged and yellow, but made no complaint of local pain or discomfort.

At the present time, fourteen months since the last operation, the disease is still actively progressing, and the calibre of the bowel is so reduced as to admit only the index finger. The patient's condition is tolerably comfortable: there is no perceptible action of the sphincter, but its lack of power has proved no serious inconvenience.

The part removed at the first operation was too sloughy to admit of a thorough examination. The part removed at the second operation was a somewhat irregular band, averaging five centimetres in breadth, and occupying the entire periphery of the bowel, which, when opened out, measured about twelve centimetres. An oval portion of its surface, five centimetres in its longest diameter, is occupied by a granular, bloody, friable, cauliflower-like mass, and

surrounded by thickened, finely-papillary mucous membrane. The mucous membrane bordering the cicatrix of the first operation shows the same thickening and papillary condition on each side for distances varying from one to two centimetres. The ulcer and the greater part of the cicatrix rest upon and are continuous with a firm mass of connective tissue and fat from one to three centimetres thick and containing several enlarged lymphatic glands. A vertical section through the ulcer shows that it rests upon a gray, finely-alveolar mass of varying thickness, two centimetres at the most, without any distinct line of demarkation from the thickened adipose tissue except near its edge, where it rests upon a white fibrous band one and a-half centimetres long and irregularly continuous with the muscular coat. The adjoining fat is streaked with white bands and shows two distinct outlying nodules, one of them irregular in outline, the other apparently a degenerated lymphatic gland. Another lymphatic gland fifteen millimetres in diameter and distant more than three centimetres from the ulcer and cicatrix shows on section numerous grayish-yellow alveoli limited by fine white or bluish septa.

On microscopical examination the mass underlying the ulcer is found to be composed of round, tubular, and irregular spaces lined with cylindrical epithelium, and separated from one another by fibrous tissue containing round or oval nucleated granular cells in great numbers. The cylindrical cells rest directly upon the stroma. Instead of a single row of regular cells there is a double or triple row, and the cells nearest the centre of the spaces are irregular in form and often globular. The cells are granular and contain one or more dark nuclei with several bright nucleoli. The centre of many of the spaces is occupied by a mass composed of highly-refracting, small, irregular bodies and fatty epithelium. Many of the cells of the stroma show advanced fatty degeneration.

At the border of the ulcer the mucous membrane shows an abrupt change; the finely-papillary condition of its surface is due to an increase in the length and diameter of the Lieberkühn glands and a notable increase in the thickness of the submucous tissue. Immediately adjoining the edge of the ulcer the tubes suddenly become longer and irregular, and plunge down into the submucous tissue where they are no longer parallel to one another. The muscular coat recedes before the descending glands and disappears entirely below the deepest portion of the growth.

The lymphatic glands show in some places their normal struc-

ture and elements, in others a stroma and alveoli similar to those found in the primary growth (Figs. 6 and 7). The larger alveoli are lined with irregularly cylindrical, the smaller with globular epithelium. Many of the alveoli are irregular in outline, and their epithelium shows a tendency to infiltrate the adjoining tissue.

CASE III. Under the care of Drs. VanBuren and Keyes. Bridget K——, an unmarried woman of 30, presented herself with a history of a protrusion at stool, 18 months previously, accompanied by slight loss of blood and pain in the back. Her physician found the protrusion to be a polyp and removed it. During the next six or eight months she remained well; then the back-ache, discomfort in the rectum, and blood in the stools gradually reappeared, and she was sent a year later to Dr. VanBuren for advice. He found "several elevated patches with irregularly granulated surfaces, the largest towards the vagina, and nearly surrounding the rectum, at from an inch and a-half to two inches and a-half from the anus; the parts movable; no other evidence of disease; general condition good." The patient's mother was suffering at the time with, and died soon afterwards of, cancer of the rectum. The diagnosis of epithelioma was made and its removal advised.

Operation. May 20, 1878, Dr. Keyes removed the lower three inches of the rectum, including the anus, and stitched the edge of the gut to the skin, using antiseptic precautions and dressings, and keeping the lower end of the rectum distended during healing by means of an inflated, egg-shaped rubber bag traversed by a rubber tube open at both ends to provide for the escape of flatus. The bleeding was moderate, and recovery prompt.

The patient has remained perfectly well ever since, and apparently suffers no inconvenience from the loss of the sphincter. Dr. VanBuren says, "She has a natural sensation of desire, and a full painless evacuation follows; after this she goes around as usual, protected only by a simple compress and napkin."

The specimen examined after hardening in alcohol, shows an ulcerated finely-granular surface beginning just above the anus and measuring two and a-half cent. longitudinally by four laterally. This surface is bordered above and on the sides by a coarsely papillary, cauliflower-like, overgrown ridge, (Fig. 9), of irregular outline, reaching at its greatest breadth a point two cent. higher up the gut than the ulcer. There is none of the thickening of the para-rectal tissue which was so noticeable a feature in Case II.

Section through the ulcer shows that it is not more than five mm. thick (after hardening) ; the surface of this section is a uniform gray, without alveoli or mottling, and rests upon the muscular coat.

A section taken from near the surface shows irregular branching tubules lined with well-formed cylindrical epithelium, (Fig. 8). The tissue underlying the ulcerated surface is composed of young connective tissue in which are imbedded irregular tubes, mostly of small size, lined with double or triple rows of irregularly cylindrical and globular epithelial cells resting directly upon the stroma. The stroma is composed of fusiform, oval, and round cells with occasional large, fully developed fibres. Some of the culs-de-sac are lined with epithelium which is not in the least cylindrical, but is globular or irregular like much of that in Case II.

A section comprising the upper edge of the ulcer and the adjoining healthy mucosa, (Fig. 10), shows that the first change is the enlargement in length and diameter of the tubes ; embryonal elements soon appear between the tubes and in the underlying layer of connective tissue, and when the border of the ulcer is reached, this embryonal tissue is very abundant ; within it are contained tubes lined with cylindrical epithelium, of various sizes and running in various directions, while underneath the muscular coat is nearly doubled in thickness. At a short distance within the edge, the surface of the ulcer is composed almost exclusively of embryonal and half-formed connective tissue ; only a few tubes are found near the surface, but in the deeper layers they are crowded thickly together. The muscular coat is much thickened and broken up into bundles separated by vessels and new connective tissue. This dissociation is carried in places almost to the extent of separating individual fibres. (Fig. 12).

The muscularis mucosæ persists under the thickened mucosa beyond the edge of the ulcer until after a large quantity of embryonal cells have been formed underneath it in the submucous connective tissue, then it disappears, and the tubes extend suddenly down into this embryonal tissue and vary greatly in size ; the regularity of their epithelium is lost, and the cells are smaller, crowded thickly together, globular and opaque. (Fig. 11.)

Section through the papillary portions shows an unbroken, not much thickened muscular coat, upon which rests the greatly thickened mucosa thrown into folds and papillæ by its own increase. (Fig. 9.)

CASE IV.—“J. H—, 50, married; admitted to the N. Y. Hospital, May 18, 1878, under Dr. Geo. A. Peters. He is a pallid but well-nourished man, and has a warty, tubercular growth, extending about half an inch from the margin of the anus externally, and from one and a-half to two and a-half inches up into the bowel, and nearly surrounding it. There is an enlarged gland in the left groin. He gives a history of an operation for fistula sixteen years ago, and of a lump appearing afterwards, which same growth, as he believes, has only lately begun to give him trouble. The pain in defecation is now so severe as to require anodyne suppositories, and he demands an operation for its relief.

“On May 29th, the operation was done with all the antiseptic precautions except the use of the spray. The gut was readily brought down and amputated, well beyond the disease, and the edges of the stump sowed fast to those of the external circular wound. The bleeding was exceedingly moderate. Ample provision was made for drainage, and a tube placed in the rectum to give vent to gas. * * * The patient did well until 8 o'clock P. M. on the fourth day, when a severe chill occurred, with a rise of temperature to 103.2° , followed by sweating. On the fifth day there was complaint of pain in the right elbow-joint, and at 10 o'clock P. M., another severe chill and sweat. On the sixth day the temperature rose to 105° , and death took place at 4 o'clock P. M. (May 31st).”

It is to be noted that a chill occurred the day before the operation, supposed at the time to be malarial.

“Body examined at 12 o'clock M. next day. Rounded cicatrices on the the legs. Drainage tubes in position near incision around anus, which looks healthy; mucous membrane everywhere stitched to integument; no union has taken place. Rectum for an inch above wound dark-colored and somewhat softened; above this, healthy: no remains of disease; but little pus, and that not badly swelling. Right elbow-joint contained a small amount of pus. Liver fatty; no abscesses. Lungs slightly œdematous, no abscesses to be found. * * Kidneys shrunken and irregular on surface, with several cysts and many scars of old cysts; cortical portion markedly atrophied.

“Microscopical examination of the disease removed from the rectum shows colloid degeneration of a cylindrical epithelioma. Well-marked linear rows of micrococci were discovered between the muscular fibres in the heart; also in the kidney.”

CASE V. Personal: Michael D——, 42, unmarried, a large, pallid fat man, presented himself June 26, 1878, with complaint of painful, difficult, and bloody defecation. Eight months previously he had an attack of rectal trouble thought to be due to piles; had bloody and painful stools. Since then he has used laxatives and enemata regularly, but defecation has been always painful, and the stools frequently bloody. Bougies have been passed quite regularly by his physician.

On examination, the finger encounters a hard, lumpy fold extending all around the rectum two centimetres within the anus. The upper limit of the tumor can be reached easily on the anterior surface, but only with difficulty posteriorly. The surface of the growth is ulcerated and the finger comes out stained with blood.

Operation, July 11th. Total extirpation, including the anus, was done by the first method described above (page 19), with full antiseptic precautions. The para-rectal tissues were found extensively infiltrated and hard, and firm bands uniting the bowel to the sacrum rendered it difficult to bring the former down and unite it to the skin without undue tension. Hemorrhage was free at first, but no vessels required ligation.

The patient recovered easily from the operation, but on the sixth day the sutures were found to have all cut out, and the rectum to have retracted about two centimetres. Six weeks afterwards there was a gap of about four centimetres between the end of the rectum and the skin, scattered over which were numerous hard granular nodules, evidently a return of the disease. These nodules increased rapidly in size, ultimately forming a mass which filled the fæces leaving only a narrow central channel through which the face passed. The patient sank gradually and died Jan. 9, 1879. No autopsy allowed.

On examination of the part removed, when fresh and spread out after division longitudinally a little to the left of the anterior median line, along a narrow groove where the mucous membrane seemed not to be involved, it was found to measure eight centimetres longitudinally and ten centimetres transversely. Along the transverse line of little pouches just within the anus the mucous membrane is raised in a ridge or fold about five millimetres high. This ridge is smooth, not ulcerated, and encircles the growth except on one side of the groove above mentioned. The surface of the tumor is ulcerated, flat, granular, and friable.

After hardening in alcohol and dividing it along the posterior

median line, the tumor is found to be two centimetres thick in the centre, and composed of a white or bluish stroma enclosing small granular alveoli. There is no trace of mucosa on the surface, or of muscle on the outside ; at the upper border is a ridge lined with thickened mucosa ; at the lower border the unaltered anus. In some places the ridge is rounded and shows the same structure as the body of the tumor ; at others it is simply a fold of much thickened mucous membrane with a central (vertical) line of connective tissue. It is evident that at the thickest part of the tumor the line followed in the extirpation was not entirely outside of it.

On microscopical examination it is found to be composed of connective tissue and epithelial elements. The latter are sometimes cylindrical and arranged in distinctly limited alveoli, but in the majority of cases the epithelium is irregular or globular, and collected in irregular masses with a marked tendency to infiltrate the adjoining tissue. (Fig. 4).

CASE VI.—Dr. Keyes. Mrs. G——, 33, was admitted by Dr. Keyes to Bellevue Hospital in July, 1878. She sought treatment on account of difficulty in defecation which had existed for about two years, with frequent desire ; the stools being always painful and bloody.

On examination a hard, lobular mass was found just within the anus, entirely encircling the bowel and narrowing its calibre to such an extent that the finger could be passed only with difficulty through it. The mass was thickest in front and on the left side, and was not adherent to the vaginal mucous membrane. There was a fistula near the anus communicating with the gut.

Operation. Total extirpation was performed antiseptically in August. During the operation an abscess of some size was found in the para-rectal tissues which were much thickened and hardened.

Peritonitis developed, and the patient died on the third day. At the autopsy the rectum for five centimetres above the point at which it had been divided was found thickened and narrowed ; the kidneys were large and fatty ; the peritoneum had not been wounded.

The tumor proved on examination to be a cylindrical-celled epithelioma.

CASE VII. Personal. Dr. P. Le B. S——, 64, married, was admitted to the Presbyterian Hospital under my care in September, 1878, with the following history : In October, 1876, he lost

some blood at stool and felt with his finger a lump inside the anus. This was pronounced to be a polyp, and partial removal was made with an *écraseur* shortly afterwards. He continued to lose blood in small quantities, and the following May (1877) another partial removal was made. His condition gradually grew worse for a year and he came to New York in May, 1878, to consult Dr. Van Buren, who found a hard irregular mass on the posterior wall of the rectum, apparently an epithelioma, and advised its removal. In September, 1878, the patient returned to New York for operation and was placed under my care by Dr. Van Buren.

He is a large, fairly-nourished man, who has always had good health, but is now anæmic, weak, and dragged-looking; has never been in the habit of using enemata, although habitually constipated; has never suffered from piles until quite recently; has no family history of cancer.

On examination I find a lobulated mass occupying the posterior wall of the rectum, beginning nearly four centimetres above the anus; it is circular, about four finger-breadths in width, and its upper edge, although quite high, can be reached with the finger. It is circular, its edge raised and well-defined; it bleeds easily when touched, and is movable on the underlying parts.

Operation, September 16, 1878. The affected portion of the bowel was removed with all antiseptic precautions by the third method described above (page 20), the line of incision lying one centimetre beyond the border of the tumor. The patient recovered easily from the operation and returned home on October 12th, with longitudinal incision through the sphincter not entirely healed. February 19, 1878, he wrote me that a thorough examination had just been made with the aid of a speculum, and that the rectum had been pronounced perfectly healthy. There was slight prolapse and occasional incontinence of flatus. His general health was better than it had been in two years. I have heard from him again recently, and he continues well.

The tumor, which was so friable that a number of pieces, some of them as large as the end of the finger, were broken off during the operation, is nearly circular, measuring six centimetres transversely, five centimetres longitudinally. Its surface, rising well above the level of the adjoining mucosa, is irregular and granular, pink and gray in the centre, dark-red at the border. Its junction with the mucosa looks worm-eaten in places, that is, the edge of the latter is free, ulcerated, and marked by a row of small livid elevations.

A vertical section through the tumor shows a very vascular upper edge continues with the mucosa, and resting on a white, juicy, thick base. The surface of section yields an abundant milky juice which shows under the microscope deformed and degenerated epithelial cells, some of them purely cylindrical, and shreds composed exclusively of them. A fresh section from the surface shows it to be very vascular granulation tissue containing portions of a few tubules lined with cylindrical epithelium. The mucosa adjoining the tumor is thickened by increase in the size of the tubes and then when the muscularis mucosæ is broken through the tubes extend abruptly downward into the softened and thickened submucous tissue. The other histological appearances are identical with those described in Case III, (Fig. 10 and 11), and therefore do not need a separate description here. The muscular coat of the intestine is not broken through.

CASE VIII. Under the care of Dr. Chas. K. Briddon. Susan S——, 36, thin and feeble, admitted to the Presbyterian Hospital September 14, 1878. Six months ago she began to suffer with severe pain in the back, and had bloody stools; this condition lasted for two months and was followed by two months of relief; then, two months ago, the symptoms recurred in aggravated form and have persisted; she has intense rectal tenesmus, constipation, and bloody stools. An aunt died of tumor of uterus of unknown character.

On examination the finger encounters at about six centimetres from the anus an irregular nodular growth, involving principally the posterior surface and right lateral half of the bowel, and continuous on the right side with a solid mass as large as a hen's egg, and fixed to the pelvic wall. The upper border of the growth can be reached by the finger with difficulty.

Operation, September 21, 1878. A circular zone, not including the anus, was removed according to the second method described above (page 19). It was found necessary to open the peritoneum, after its recognition, in Douglass's cul-de-sac to the extent of about five centimetres; this opening was afterwards closed with catgut sutures.

The patient died on the tenth day, after having passed through an attack of peritonitis which was controlled by morphine and cold applications to the abdomen. She was unable to retain food, and died of exhaustion. At the autopsy the sutures were found to have all cut out, and the pelvic retro-peritoneal space was infiltrated with pus.

The affected portion of the rectum was seven centimetres in length, and presented a deep, funnel-shaped ulcer with irregular, raised edges, and some thickening of the adjoining mucous membrane ; the ulcer was six centimetres in diameter, and four centimetres in depth. The lumen of the rectum was contracted to a diameter of fifteen millimetres. The histological appearances were similar to those in Case V.

MICROSCOPICAL STUDIES ON ABSCESS OF THE LIVER.

By J. C. DAVIS, M.D.

IN vol. xxvii of the *New York Med. Journ.*, I published some clinical observations on abscess of the liver, and took the ground that, in all probability, abscess of the liver was due in most, if not in all cases, to an inflammatory process in some of the organs of the abdominal cavity, from which the radicles of the portal system take their rise, excepting, of course, those cases which are due to a parasitic origin (*Echinococcus*). Abscess of the liver seems to follow only embolism in the portal vein. These embolisms are due to transported particles of pus or shreds from the wall of some pus cavity, which being carried into the portal system, produce either suppurative phlebitis in the *porta hepatis*, the so-called *pyle-phlebitis*, or suppurative process in any part of the liver in which an embolus may have lodged. The question why pus or tissue in suppuration, if transmitted into a healthy tissue, should again produce suppuration, cannot be satisfactorily answered. We know that pyæmia, which is invariably due to a primary suppurative process on the outer surface of the body, or in an internal organ, is very commonly accompanied by multiple abscess in the liver. The conclusion that such abscesses are mainly produced by em-

bolism of pus, gains ground, if we consider the fact that pyæmia will never ensue unless suppurative phlebitis be present in the neighborhood of the primary suppuration.

My microscopical studies of abscess of the liver have been made on sections from a case of multiple abscess produced by pyæmia, the liver being crowded with inflammatory foci, some of which are broken down into abscesses. Sections from this liver, if viewed with a power of one to two hundred diameters, exhibit innumerable foci of inflammation. Some are yet in the earliest stage, and others in full suppuration. In so far as conclusions may be allowed from neighboring analogous formations, the history of suppurative inflammation of the liver is, I think, plain.

It is, in my opinion, beyond question that all inflammatory foci have their seat in the interstitial tissue, built up by the relatively small amount of connective tissue, which heretofore has been called "Glisson's capsule," and which accompanies all the branches of the portal vein, the hepatic artery and the bile ducts. It is well known that this connective tissue does not in the human liver enclose the single lobules, but is present only in a limited portion of the circumference of the lobules.

The inflammatory foci vary greatly in extent. Some consist merely in a slight infiltration of the interstitial connective tissue; others occupy the whole amount of interstitial tissue between several lobules, while others are produced by both involution of the interstitial tissue and the lobules themselves. Lastly there are inflammatory foci, in which no distinction between interstitial connective tissue and epithelial tissue of the lobule is possible, but all look granular with a low power, which means, that there have already formed, or are forming, small abscesses.

The origin of abscess of the liver is evidently the same as that of plastic interstitial hepatitis and miliary tubercu-

losis of the liver; although the termination is entirely different in the three kinds of inflammatory process. In the process termed plastic interstitial hepatitis, the termination consists in a new production of dense fibrous connective tissue, the result being that which we call cirrhosis of the liver. In tuberculosis the inflammation leads to a complete loss of blood-vessels in certain territories, with the result of shrinkage of the inflammatory elements, originating from all the tissues in a circumscribed territory. They become separated and isolated, thus producing that which we call a tubercle or a dry abscess.

As to the origin of the inflammatory elements in cirrhosis, Heinrich Müller* has made accurate studies. He has demonstrated that not only the interstitial connective tissue and the capillary blood-vessels are transformed into inflammatory elements, but that the liver epithelia also share in the formation of such elements, through the increase of the living matter in their bodies. The result of this is a recurrence of the formation of indifferent or medullary corpuscles. All these corpuscles remain uninterruptedly connected with each other, become spindle-shaped and are partly transformed into basis substance, so as to produce a considerable amount of fibrous or homogeneous dense connective tissue. Thus the participation of the liver epithelia in the inflammatory process fully explains why in cirrhosis many of the lobules are so considerably reduced in size, while the newly formed connective tissue, which very soon retracts, is so notably and greatly augmented.

The objections which might be raised against Müller's conclusions, are based merely upon hypothetical grounds, viz., that epithelia would never produce connective tissue and that on the contrary connective tissue never would produce epithelia. This objection falls to the ground in con-

* Sitzungsber. der K. K. Akad. der Wissenschaft., in Wien., 1876.

sideration of the fact that in the earliest stages of embryonal development, there are present indifferent or medullary elements only, from which all future tissues must necessarily arise.

As to the origin of the inflammatory elements in tuberculosis of the liver, direct observations are wanting. It is reasonable to conclude, however, that in tuberculosis just as well as in cirrhosis, the liver epithelia themselves furnish a large amount of medullary tissue, which, owing to the absence of blood-vessels, shrivel, become disintegrated and exhibit the crumbly material termed yellow tubercle. I have met with a case of tuberculosis in the liver of a duck, in which some of the lobules were partly, others entirely transformed into yellow tubercles, evidently through the participation of the epithelia in the production of indifferent elements.

As to suppuration of the liver, my studies have led me to the conviction that, although the inflammatory process commences in the interstitial or connective tissue, soon thereafter the epithelia also become involved, taking their part in the formation of indifferent or medullary elements. In order to illustrate, what I wish to say on the morbid changes within the protoplasm of the epithelia of the liver, I must briefly recapitulate C. Heitzmann's discovery of the structure of protoplasm in general. These observations were first published in 1873, in the transactions of the Imperial Academy of Sciences in Vienna. It would be but presumption on my part to attempt a defence of the correctness of Heitzmann's views, when so many of the ablest microscopists of the old world have already accepted them. Actual observation has satisfied me of the existence of this reticulum; my deductions respecting it may be erroneous, but the microscope certainly cannot make visible that, which does not exist.

According to this author's views each protoplasmic body,

the formerly so-called cell, is built up by a delicate reticulum, the points of intersection of which are the formerly so-called granules of the protoplasm. The nucleus, eventually the nucleolus, is but a larger granule, inasmuch as the reticulum is in close connection with both the nucleus and the nucleolus. This reticulum is living matter and flat layers of the same matter also build up the shell of the nucleus and the bounding layers of the protoplasmic lump. In connective tissue of any description the protoplasmic bodies (formerly so-called cells), exhibiting the reticular structure, send delicate offshoots into the basis substance, which being formations of the living matter, produce a reticulum within the basis substance, somewhat wider than that of the protoplasmic bodies themselves. In the meshes of the protoplasm there is present a lifeless fluid, while in the basis substance of the connective tissue the meshes of the reticulum contain a solid mass, which has evidently arisen from the former protoplasmic fluid.

Through the reticulum of living matter which pierces the basis substance everywhere, all protoplasmic bodies are brought into uninterrupted connection. The old cell doctrine, which has suggested that the animal body is built up like a dwelling with innumerable individual bricks, put together by the cement of the inter-cellular substance, has fallen to the ground. The new doctrine suggests that in the body the living matter is in uninterrupted connection and that the whole body as such represents the individual, which is traversed by closed spaces (blood and lymph vessels) containing isolated protoplasmic bodies (blood and lymph corpuscles). The plan of organization is the same as in an individual amœba, in which there may appear temporarily at least, closed spaces, so-called vacuoles, in the fluid of which there may float about, isolated particles of living matter.

In epithelial and endothelial layers the single elements are protoplasmic bodies, flattening each other and separated from each other by the cloak of the horny cement-substance. This cloak, however, does not isolate the protoplasmic bodies, as the cements-substance is everywhere traversed by delicate conical threads, the so-called thorns, which are the bridges of living matter uninterruptedly uniting all neighboring epithelia and endothelia. These, therefore, form continuous layers of living matter, which by means of delicate offshoots of the same matter, are also in direct union with the subjacent formations of connective tissue.

If this doctrine be correct, we shall see in the inflammatory process that the living matter, owing to the increased afflux of nourishing material, must be augmented and from it must arise all elements heretofore termed inflammatory corpuscles. In inflammation, however, the newly-formed elements may remain in uninterrupted connection, thus representing a tissue. If, on the contrary, the inflammatory elements be separated from each other by being torn apart, the result will be pus from the broken down tissue, and the sum total of the pus corpuscles together with a certain amount of serous fluid, will go to make up that which we call abscess.

In the earliest stages of interstitial hepatitis, marked only by slight changes of the connective tissue, we see with higher powers of the microscope (1000-1200 diameters) that the protoplasmic bodies,—the connective tissue cells—are coarsely glanular; the nucleus is hidden by the coarse granules, or it is visible in the shape of a shining homogeneous globule of living matter. Such globules, of varying size, are also scattered throughout the fibrous basis substance and have evidently originated from particles of living matter, which in the normal condition produce the living reticulum in the basis substance. Such formations appear

in the largest number around the blood-vessels, both arteries and branches of the vena portæ. Next we see that the fibrous basis substance has completely disappeared and is replaced by a large number of partly shining homogeneous, partly nucleated protoplasmic lumps, which are connected with each other by means of delicate threads. (See Fig. 1).

The transformation of normal into inflamed connective tissue has evidently taken place by liquefaction or dissolution of the basis substance and increase of the living matter held therein with the result of a new-formation of inflammatory elements. In this stage the blood-vessels in the inflamed tissue are as yet recognizable, although their endothelial walls are considerably thickened, the endothelia themselves being engaged in a lively new production of living matter; while the central lumen is first narrowed, afterwards completely lost and filled up with inflammatory elements. It is the same process of proliferation, which breaks down the portal veins, the hepatic arteries and the bile ducts; the same process, which leads to the consolidation of the capillaries within the lobules and their transformation into inflammatory elements. All these elements are originally united with each other, thus representing what we call an indifferent, or inflammatory, or medullary, or granulation tissue. In foci of inflammation, where the process has advanced up to the formation of pus, the connection of the single protoplasmic bodies is lost. Here isolated pus corpuscles are suspended in the albuminous serum, which latter in chromic acid specimens, such as I have exclusively used for examination, looks finely granular. The epithelia within the lobules of the liver at the same time share in the inflammatory process in a very marked way. Firstly they undergo changes, as first described by Heinrich Müller in the above quoted publication. They swell up; the cement substance becomes invisible between a number of proto-

plasmic bodies, which now look like large irregular clusters. Necessarily, with the loss of the cement-substance goes also the loss of a number of bile capillaries. The epithelia and the protoplasmic bodies arising therefrom, become coarsely granular with their living matter augmented to such an extent that the nuclei are mostly concealed; they have in part also become increased in size, shining and homogeneous. Many of the granules assume the shape of nuclei and throughout the whole cluster new lines of demarkation appear, which lead to the formation of relatively small lumps of protoplasmic bodies, viz., inflammatory elements. All these elements are first directly connected with each other by delicate threads and in this condition represent an indifferent tissue, closely resembling that formed from the connective tissue. Lastly, however, these medullary elements are completely separated from each other and now represent pus corpuscles. (See Fig. 2.)

The transformation into pus may be localized in the interstitial connective tissue alone; or it may involve the interstitial connective tissue and a portion of the neighboring lobules; or, lastly, a large territory of the liver-tissue being engaged in the inflammatory process, breaks down into pus. The result under all circumstances will be an abscess, varying only in size. As to the emigration of colorless blood corpuscles, which was thought to be the only source of pus (J. Cohnheim), I have nothing to say. The origin of pus in my specimens at least, could be satisfactorily traced from the breaking down of the tissue itself, so much so, that in my opinion the emigrated colorless blood-corpuscles, if they were present at all, could have been by no means the main source of the pus corpuscles.

Abscess sometimes forms in the liver, which is never made manifest by noticeable symptoms; the patient going on perhaps for years, and finally dying from some other disease,

or from some traumatic cause. This never happens in multiple abscess of the liver in pyæmia, as the disease is generally rapid in its course, and death its result. In a case of formation of abscess of the liver of long standing, the abscess becomes encysted. The changes leading to the formation of a sac around the abscess have been studied by myself in a specimen, in which a liver abscess of the size of a man's fist was formed on the convex surface close to the peritoneum, which was found transformed into a tough pseudo-membrane of at least 4 mm. in thickness, and closely adherent to the diaphragm.

Microscopic sections made through the pseudo-membrane and the adjacent portions of the liver, again illustrate the way in which the pseudo-membrane, or *membrana pyogena*, had been formed. It was very plain to be seen, with high powers of the microscope, that the interstitial connective tissue of the liver and the connective tissue of the peritoneum in many cases were broken down into indifferent or medullary elements, all these being in uninterrupted connection by means of delicate thorns of living matter. The epithelia of the liver were transformed into medullary tissue, in exactly the same way which I have described above, when speaking of the formation of an abscess. The difference was, that in the latter instance the medullary elements were left in uninterrupted continuity. In some places the medullary elements became spindle shaped, and were partly transformed into a basis substance, that led to the formation of a delicately striated cicatricial connective tissue. The main mass of the medullary elements, however, had been simply transformed into a homogeneous or slightly granular basis substance, with rather scanty protoplasmic bodies. With high powers the reticular structure of the basis substance was plainly visible, due evidently to the presence of the living matter throughout the whole newly-formed mass of

connective tissue. Enclosed in this mass I met with scanty capillary blood-vessels, and a large number of islands of unchanged liver epithelia, which latter had escaped the transformation into medullary elements, and became involved in the newly formed connective tissue. (See Fig. 3.)

In looking over the literature on this subject, I have found the following, which may be worthy of quotation:

"The young cells, which in local irritations fill the connective tissue interstices, ought and must, for the greater part, be regarded as having 'migrated in.' But these still remain provisionally connective tissue cells, and their place of formation were the surrounding connective tissue cells. Even to-day yet we must not look upon the connective tissue as quite unfruitful, because an experiment of v. Recklinghausen proves that even excised pieces of the cornea, under proper conditions, are capable of a moderate cell production." (Rindfleisch, p. 455, Phila. ed., 1872.)

"The pus corpuscles which usually accumulate so as to form abscesses, are almost entirely emigrants, although recent investigations render it highly probable that they may also originate by the endogenous process of the liver cells" (Green's *Pathol. and Morbid Anat.*, Phila., 1878).

Remak, Buhl, L. Oser and S. Stricker maintain "that pus corpuscles arise in various epithelia, partly by division, partly by endogenous formation, also from connective tissue corpuscles, from muscular cells, etc."

The conclusions I have arrived at through my microscopical studies on formation of abscess in the liver, are as follows:

1. The inflammation invariably starts in the interstitial connective tissue of the liver, and secondarily involves a varying amount and number of the lobules of the liver.
2. Both the connective tissue with its blood-vessels and the epithelia of the lobules, through an increase of the liv-

ing matter, become transformed into embryonal or medullary elements, thus constituting what is termed the inflammatory infiltration.

3. The medullary elements originally connected with each other by means of delicate thorns, in turn become isolated by rupture of these thorns, and now being suspended in a serous fluid, represent pus corpuscles, the sum total of which is called an abscess.

4. The pus corpuscles, therefore, are a direct offspring of the liver tissue, both connective and epithelial, and no indication could be seen of an emigration of colorless blood corpuscles, which latter may be assumed, but by no means could be directly proved.

5. On the boundary of the abscess the inflammatory tissue is transformed into a homogeneous or striated connective tissue, building a wall around the abscess. In the formation of this, also the peritoneum shares, if the abscess had formed near it.

6. Through my studies the doctrine of C. Heitzmann of plastic and suppurative inflammation has been satisfactorily corroborated. As long as the indifferent elements remain united with each other, they represent a tissue, and are ready at any time to produce a basis substance, viz., new connective tissue. On the contrary, if the indifferent elements are broken apart, they become pus corpuscles, arisen from all constituent elements of the inflamed tissue itself.

EXPLANATION OF THE PLATE.

Fig. 1. Formation of pus in interstitial connective tissue (Glisson's capsule) of the liver ; *a a*, fibrous basis substance in normal condition, with protoplasmic bodies *b b* ; *c*, portal vein ; *d*, bile-duct ; *e e*, increased living matter in shape of shining homogeneous lumps ; *f*, inflammatory elements arisen from epithelia of bile-duct ; *g g*, zone in which the whole connective tissue is transformed into medullary elements, all being connected by means of

Fig. 1.

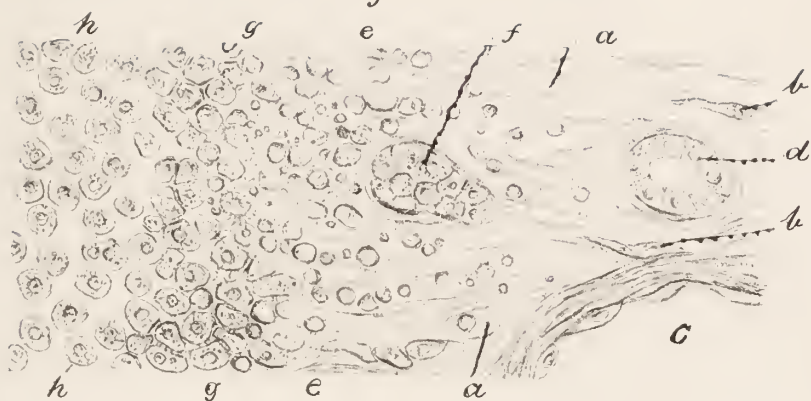
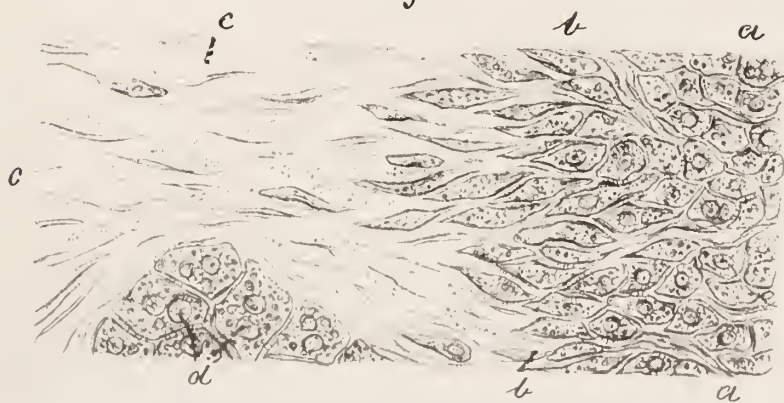


Fig. 2.



Fig. 3.



delicate threads of living matter ; *h h*, zone in which the medullary of elements are torn apart and represent pus-corpuscles. Magnified 1000 diam.

Fig. 2. Formation of pus from the epithelia of a lobule of the liver ; *a a*, normal epithelia, separated from each other by the cement-substance, united by delicate thorns ; *b b*, capillaries of the lobules ; *c c*, zone in which the epithelia are coarsely granular, transformed into multinuclear lumps ; *d d*, narrowed capillaries, with swelled endothelia ; *e e*, zone of medullary elements, arisen from both epithelia of the liver and endothelia of the capillaries, all connected with each other ; *f f*, medullary elements torn asunde and no representing pus-corpuscles. Magnified 1000 diam.

Fig. 3. Formation (d) of the connective tissue capsule around the abscess of the liver ; *a a*, indifferent or medullary elements, produced by inflammation of both the interstitial connective tissue and the epithelia of the lobules ; *b b*, zone in which the medullary elements became spindle shaped, and partly transformed into basis-substance ; *c c*, newly formed fibrous basis-substance with scanty protoplasmic bodies ; *d*, island of unchanged liver-epithelia. Magnified 1000 diam.

THE TENDON REFLEX IN THE INSANE.

By J. C. SHAW, M. D.

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THE fact that there is often in general paralysis ataxia of gait—and sometimes it can even be elicited from the patient that he has lancinating pains—the analogy between this condition and locomotor ataxia, the disease with which the state of the tendon reflex has been most closely connected, has led me to examine into the state of the tendon reflex in paretics.

It must be understood, however, that the ataxia of paretics, and that in locomotor ataxia, is clinically very different, and it appears to me from limited observation that pathologically it also differs widely in many respects.

I have since extended my observations to cases other than general paralysis. I have examined altogether 130 cases.

In 10 cases of very decided general paralysis which I have examined, in three the tendon reflex is entirely absent. In a fourth case, if present at all, it is so very slight that it is virtually absent. In all these cases there is a certain ataxia of gait, and the disease is well advanced. In none of the cases which I have seen in the early stages of the disease is the tendon reflex absent. In one case in which

there is very decided difficulty in walking and slowness of speech, in which I expected to find the tendon reflex absent, it was present. In 15 cases of various forms of mental disorder it was found absent. Some of them were cases of dementia, following some acute trouble; two or three were in cases of senile insanity; one was a vigorous man, with delusions of persecution and periodical attacks of excitement.

In 29 cases the reflex was slight. These comprised a variety of cases with little similarity to each other. In 76 cases the reflex was normal. In the cases other than the paretics I took them just as I found them in the wards.

In examining these cases I have met with the difficulties which are generally met with in making any examinations of the insane. In each case the tendon of the quadriceps femoris was used, and percussion was made just below the patella. The same variations as to the part and the manner of striking the tendon, as is found in the healthy subject, was also found here. Sometimes the reflex was more readily obtained when the tendon was struck on its inner or outer edge. I always placed my hand just under the thigh, just above the knee, and allowed the foot to hang loosely, and causing the whole weight of the thigh to rest on the hand. With insane patients, in whom it is not always easy to make them understand what you wish them to do, I learned that often at first they would have some of the muscles of the leg or of the thigh in contraction, and whilst such was the case, it was not possible to obtain the reflex, and this only manifested itself after complete relaxation of all the muscles had been obtained. I always percussed upon the bare skin.

Westphal,* from an examination of the tendon reflex in paretics, has come to the conclusion that whenever the re-

* *Archiv für Psych.* Band. 8, Heft. 2, pag. 574.

flex is absent, the diagnosis of degeneration of the posterior fibres of the spinal cord can be made.

Muhr* in an examination of fifty cases, found it absent in six cases; he also concludes with Westphal that the absence of this reflex is diagnostic of degeneration of the posterior fibres, but he does not appear to have had post mortem evidence.

Numerous articles have appeared on the physiology of the tendon reflex, all agreeing that it is a reflex action. Tschirjew and Gray found that by destroying the lumbar cord in animals, the tendon reflex was entirely abolished; Schultze and Fürbringer, by section of the crural nerves, abolished this reflex; from this we would expect to find a lesion in the lumbar cord in man to account for the absence of this reflex. The following is a brief history and post mortem in one of my cases of paresis, in which the tendon reflex was absent:

P. E., aged 27, admitted August, 1875, attack having begun six months previously. He is excited, and has delusions of wealth and greatness. When I first saw him the disease was far advanced; he was feeble, ataxic in speech and gait, had marked tremor of facial muscles, left pupil slightly contracted, and delusions of wealth. He gradually became exhausted and died. Post mortem showed decided lesions of the meninges and brain; also spinal cord, the part which alone will concern us for the present.

The cord has been hardened in bichromate of potassa, sections made and mounted in Canada balsam after L. Clarke's method. These sections are from the lumbar region, and there is to be seen a meningitis with cortical sclerosis everywhere in the diameter of the cord, but the sclerosis is greatest in the posterior fissure columns and roots. (Fig. I.)

This case is in confirmation of the views of Prof. West-

* Muhr (*Psych. Centralbl.* No. 2, 1878), *Journal Nervous and Mental Disease*, Oct., 1878.

phal, for some of his observations have been controlled by post mortem and histologic examinations. The changes which have taken place in this cord are due to a meningitis, which is most marked in the posterior regions. There is an interesting point in connection with this sclerosis, and that is that in paresis the meningitis is generally

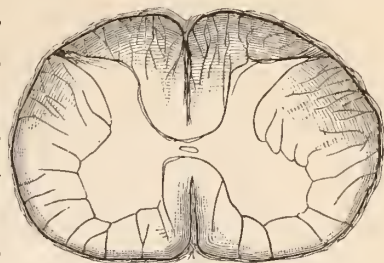


FIG. 1.

greatest in the posterior fissure. Now this selection of the posterior part of the meninges and cord as the seat of the most intense pathological conditions is apparently not uncommon, and may be the explanation of a great many sensorial symptoms which we meet with ordinarily, and which are yet obscure. In this connection a case recently recorded by Debove* is of interest. In a case of tubercular spinal meningitis he found that the disease was most intense in the posterior fissure, and in the lumbar region more marked than anywhere else. It appears to me that this may be connected with the greater functional activity of the asthesiodic tract, which we know is in continued action.

In fifteen cases, composed of dementia, etc., in which the reflex is absent, I think, justify me in concluding that in most of them, if not in all, there is present a form of chronic spinal meningitis with cortical sclerosis. This number is too large to be looked upon as cases in which the reflex is absent without pathologic change. I am further led to this conclusion from an examination of this specimen (Fig. 2) which I present to you; a section from the spinal cord in a case of chronic mania (the patient having died in

* Debove: Note sur la méningite spinale tuberculeuse.—*Le Progrès Médical*, January 18, 1879.

the Asylum at Middletown, Conn.), sections having been made by me while working in Prof. E. C. Seguin's laboratory as his pupil. This section shows a slight meningitis with cortical sclerosis, and it appears to me that this sclerosis may be enough to abolish the tendon reflex. If in future observations I should be able to demon-



FIG. 2.

strate by post mortem examination in some of these very cases that this is really so, it will be of considerable aid in determining if there has been an extension of pathologic conditions to the cord.

I cannot close this short paper without thanking one of my assistant physicians, Dr. John S. Woodside, for his assistance in examining these cases.

CONTRIBUTIONS TO SPHYGMOGRAPHY.

BY MARY PUTNAM JACOBI, M.D., R. W. AMIDON, M.D.,
AND E. C. SEGUIN, M.D.

I.

THE INFLUENCE OF PAIN UPON THE PULSE-TRACE.

By DR. PUTNAM JACOBI.

“**A** SUDDEN impression, however brief, made upon a sensitive nerve, always determines, as initial effect, or slackening or a diastolic arrest of the heart.”*

In these words M. François Franck sums up the results of numerous experiments, in which the effects upon the heart, of peripheric irritations, are delicately inscribed and analysed by means of graphic apparatus. The trigeminus was irritated by vapors applied to the nose, or by rapid burning of the nostril with a red hot needle; and the laryngeal nerves, by touching the mucous membrane of the larynx with a brush dipped in ammonia: the auricular branches of the trigeminus, branches of the cervical plexus, sciatic and crural nerves, were each irritated mechanically: finally, the abdominal fibres of the sympathetic, by pinching the peritoneum inflamed by means of previous exposure to the air. “In all these cases, the arrest or slackening of the cardiac pulsations was observed as a constant phenomenon.” (p. 255.) This would have have passed unperceived, but for the modification introduced in the graphic tracing of the cardiac pulse movements.

* Travaux du laboratoire de M. Marey, année II, 1876, p. 227.

It occurred to me that the foregoing experiment might be exactly reproduced on the human subject, by observing the sphygmographic tracing of the pulse at the moment that a dentist should touch the exposed nerve of a tooth. Through the kindness of Dr. Kidder, an opportunity was afforded to test this suggestion. Mahomed's sphygmograph was carefully adjusted to the arm of a lady, who, at the time, was suffering no pain, but whose teeth were about to be filled.

Trace I, was taken while the upper part of the tooth was being scraped, an operation causing comparatively little

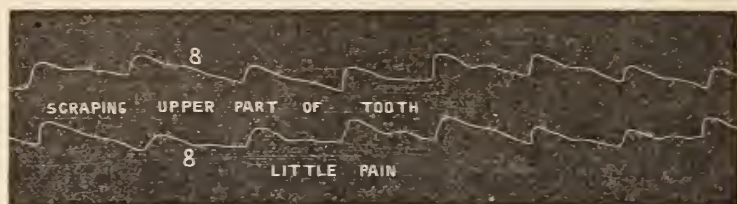


FIG. 1.

pain; the trace is regular, and the cardiac impulse strong and well sustained.

In Trace II, the upper line is taken before any manipulation of the tooth. On the lower line at B, the probing begins, and at the same moment the base line falls, to rise

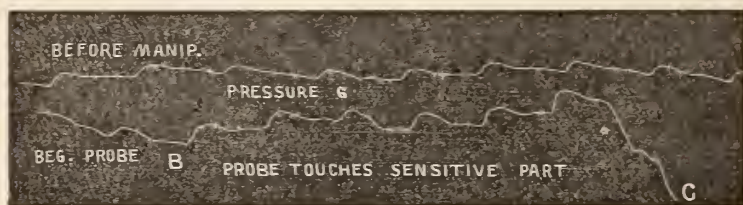


FIG. 2.

again, but to continue somewhat irregularly. At C the probe touches the sensitive nerve, and instantly the line falls, the cardiac pulse is altogether, though momentarily, arrested.

In traces III and IV the same fall is also clearly seen at the moment that the nerve is touched, (points B), but the fall is not so complete, the needle not carried entirely off the paper, and the tracing is therefore resumed.

These traces therefore, afford an interesting confirmation of the law of François Franck, that peripheric irritation of any sensitive nerve, in proportion to its intensity, inhibits the action of the cardiac ganglia. This is again, a branch of the more general law established by the experiments of Goltz,* that the irritation of any one part of the nervous system, is capable, under certain circumstances, of inhibiting the action of various other parts.

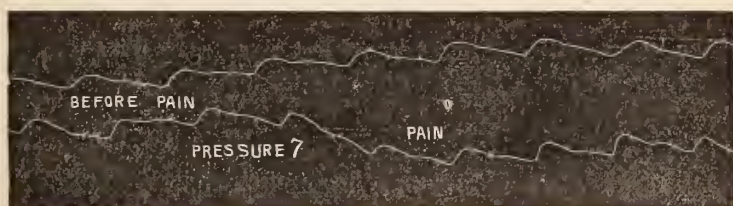


FIG. 3.

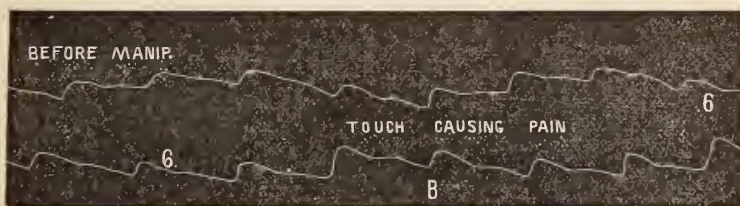


FIG. 4.

II.

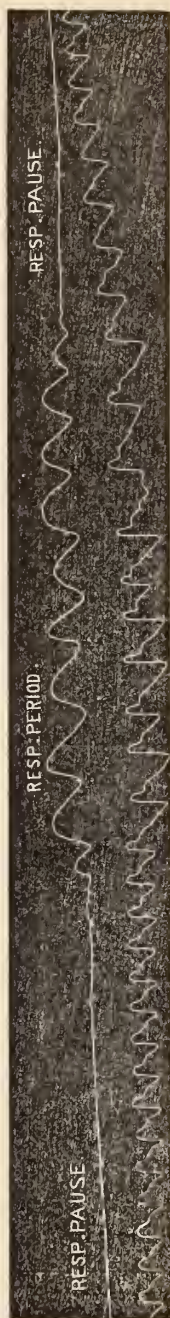
BY DR. AMIDON.

CASE I. *Exemplifying peculiarities of the pulse during Cheyne—Stokes' respiration*, Fig. 5.

A man, aged 49, service of Dr. James W. McLane, New York Hospital, who had had acute rheumatism four times, followed, after the lapse of several months, by shortness of breath, ascites and general anasarca.

Examination of the patient revealed a loud mitral regurgitant and fainter aortic regurgitant murmur. The pulse at this time was very irregular.

* Beiträge zur Lehre von den Functionen der Nerven centren des Frosches, p. 39.



Examination of the urine, which was scanty, showed the presence of albumen, hyaline and granular casts and fatty renal epithelium.

While under treatment, he one night became delirious, and required restraint.

The next day he continued in the same restless, unconscious condition, mumbling to himself, but answering no questions. At 8.05 P.M. the respiration became irregular, and very soon it assumed a Cheyne—Stokes' character of the most perfect type.

REMARKS.—The peculiarity in this case was that changes in the rhythm of the respiration were accompanied by changes of the pulse.

The changes in respiration consisted in the alternation of periods of complete absence of breathing (respiratory pause) with periods of more or less normal breathing (respiratory periods). For instance, during 10 to 15 seconds the patient would not breathe at all. At the expiration of that time, if the patient were watched closely, there would be seen a twitching of some of the inspiratory muscles, followed by a spasmodic contraction of the muscles of forced inspiration, a pulling up of the ribs and the admission of a slight amount of air into the lungs. This constituted the first respiratory movement designated in the trace by a slight deviation from the horizontal line, which represents the respiratory pause.

To this succeeds the respiratory period, lasting 10 or 12 seconds, wherein occurred from eight to ten respirations, forced in character, and at the rate of 35 to the minute.

FIG. 5.

The respirations became more superficial toward the end of this period, and after the last inspiration, which was slight, the chest gradually sank into the state of repose constituting the period of respiratory pause, to be broken again at the end of 10 or 15 seconds by the spasmodic inspiration.

These changes are represented on the trace by a series of ten irregular curves, representing the respiratory period, between two straight lines which denote the respiratory pauses.

The changes in the pulse are well shown by the sphygmographic tracing taken at the time.

During the respiratory pause the pulse-beat was at the rate of 120 per minute, while during the respiratory period it was only 60 per minute.

Thus the pulse was only half as fast during the respiratory period as during the pause.

This relation between the respiration and pulse was, however, no coincidence, for, with the sphygmograph on the wrist and the attention also turned to the respiration, the retardation of the pulse and the commencement of respiration was simultaneous, as were the cessation of respiration and the acceleration of the pulse. These alternations were watched for over an hour, and recurred with remarkable regularity.

The patient recovered in a few hours under the use of muriate of pilocarpin administered hypodermically, but died some months later in a state of uræmic coma.

Among other lesions, it was then discovered he had atheromatous degeneration of the mitral and aortic valves and all the arteries, calcareous plates in all the larger arteries and lobulated, granular kidneys.

CASE. II.—*Peculiar senile tracing.* Fig. 6. New York Hospital, service of Dr. W. H. Draper.—A bed-ridden woman, 88

years old, subject to occasional attacks of clonic spasms of the upper extremities, not wholly like either chorea or paralysis agitans. She also had quite severe lumbago.



FIG. 6.

REMARKS.—Her arteries were not atheromatous to the touch, but she had an aortic direct murmur. This is very well shown in the trace by the broken ascending stroke, which becomes oblique in its upper half.

On auscultating the heart, it was also observed that alternate systolic sounds were reduplicated, producing the pseudo-dicrotism shown in every other curve in the trace.

Another peculiarity of the case was the habitually slow pulse, which, when the trace was taken, was 28 per minute.

CASE III.—*Tracings in a case of facial erysipelas, aborted with quinine and aconite.* Fig. 7. Service of Dr. J. W. McLane, New York Hospital.—J. W. male, aged 27 years.

October 22, 1878.—At 2 P.M. the patient noticed a redness of the face with swelling, chiefly in the inner canthus of the left eye.

He was very restless and had a severe headache all night.

October 23d.—On rising the patient felt very languid and had pains in all his bones.

At 8.30 A.M. there was quite diffuse redness and swelling around the left eye, and a feeling of great tension in the parts. P. 120. R. 24. T. 38.1°C. (100.5°F.).

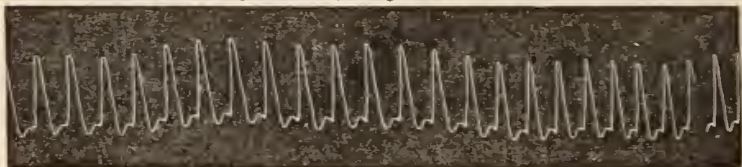


FIG. 7.

9.20 A.M.—P. 128. R. 20. T. 38.1°C. (100.5°F.). Pulse very full. Patient complains much of the feeling of tension.

Administered 2.40 of quinine in solution, and .30 of the common tincture of aconite root.

10 A.M.—P. 120. R. 24. T. not taken. Administered .30 tr. acon. rad.

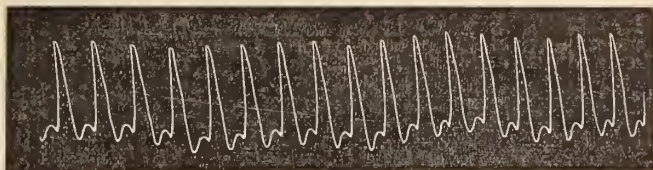


FIG. 8.

10.45 A.M.—P. 126. R. 18. T. 38.4°C. (101.1°F.). The redness was spreading on the forehead, nose and cheek. The left eye is almost closed. Gave .30 tr. acon. rad.

11.20 A.M.—P. 120. Adm. .30 tr. acon rad.

11.30 A.M.—P. 132. R. 20. T. 37.1° (98.5°F.)

12.15 P.M.—P. 108. Perspiring some on the forehead.

12.20 P.M.—Adm. .18 tr. acon. rad.

12.30 P.M.—P. 120. R. 24. T. 37.1° (98.8°F.).

1.36 P.M.—P. 122. Adm. .30 tr. acon. rad.

1.40 P.M.—P. 106. Patient feels some tingling in the right hypothenar eminence.

4.35 P.M.—P. 100. R. 21. T. 37.1° (98.8°F.). Applied iced lead and opium wash over eye, forehead, cheek and nose to relieve some little tension still felt in the parts. Pulse, respiration and temperature remained down, and convalescence was rapidly completed.

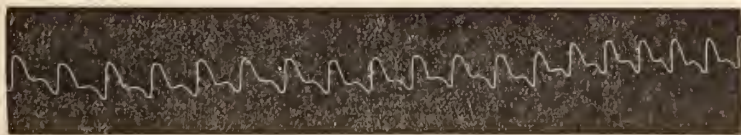


FIG. 9.

REMARKS.—Very many sphygmographic tracings were taken, but the three appended exhibit the salient points in the case. Trace No. 7. was taken at the beginning of the treatment. By its large excursion and rapidity, it shows the excited heart's action; by its sudden and large rise and

sudden fall it denotes diminution of the arterial tension, as does also the delayed and small dicrotic stroke.

Trace No. 8 taken forty minutes later shows further diminution of the arterial tension, the effect of the first dose of aconite.

Trace No. 9 taken seven and a half hours after the commencement of treatment presents a nearly normal appearance. The rise is moderate, the fall is gentle, interrupted by a slight dicrotic halt. The improvement in this trace over the last is due in great measure to the subsidence of the fever, aided perhaps by the sthenic effect of the quinine, all the transient action of the aconite having disappeared. No physiological effects followed the administration of the quinine 2.40 (40 gr.) in one dose, while the first slight tingling from aconite occurred only after giving 1.68 gm. (28gtt.) in four hours.*

III.

CASE OF SLOW PULSE AND EPILEPTIFORM CONVULSIONS.

BY DR. SEGUIN.

H. G., aged 43 years, seen in consultation with Drs. Wm. Detmold and S. S. Jones in September, 1875. Present illness dates back more than one year. In former life, in adult age had frequent attacks of "glimmering before the eyes," lasting from a few minutes to half an hour, and invariably followed by headache, lasting nearly all day. Never observed absolute blindness in these attacks. These seizures have become fewer in the last few years; none in eight months. In the spring of 1874, patient consulted Dr. Detmold on account of a number of severe epileptiform attacks, without biting of tongue and subsequent drowsiness. It

* NOTE.—Since writing the above I have found, in the *Revue Mensuelle de Médecine*, 1878, p. 935, an article by Dr. Biot, designated "An additional note on some peculiar points of Cheyne.—Stokes' Respiration," in which he inserts traces of both respiratory and cardiac movements. R. W. A.

was then for the first time observed that the patient's pulse was very slow, from 24 to 28 beats per minute. Under tonics the pulse-rate increased slightly.

The patient describes some of his attacks as consisting chiefly in a want of breath, and severe constriction about the chest; no actual pain, and no symptom of angina pectoris. In some attacks he is a little dizzy, and even loses consciousness for a moment. These seizures have been very frequent, day and night. Even in the worst attacks the patient has never injured himself. Dr. Jones saw him in one epileptiform seizure; he then seemed like a man struggling against asphyxia, had clonic spasms, and a bluish face; the pupils were not examined; consciousness was not perfectly lost.

Examination.—Patient is a medium-sized, spare and pale-faced man. He sits naturally, and walks slowly but well around the room. Features anxious and drawn, suggestive of hypochondriasis, no headache. Nothing abnormal about the head. Some ten days ago Prof. J. H. Knapp examined the eyes with the ophthalmoscope and found them normal. No paresis, numbness, anæsthesia, etc., in the limbs. The pulse beats 26 and 27 per minute in two counts (not successive); the artery seems tense, and by the finger one would describe the pulse as *pulsus tardus et durus*, no enlargement of veins, or evidence of embarrassment in the capillary circulation. The heart's impulse is very faintly perceptible to the finger in the fifth intercostal space within the nipple line; the dulness area is not increased. The cardiac sounds are almost normal; the impulse movement (systole) is apparently a rolling one, with a slight, inconstant systolic murmur, best heard over the cartilage of the fifth rib between the outer edge of the sternum and the nipple. It is probably an unusual contact sound of heart against the parietes. At the apex of the right lung there are slight dulness, increased vocal resonance, and prolonged expiration. Much nervousness (even to crying) has been observed, and patient has been disposed to magnify all his symptoms. Urine normal; no sign of tumor in cervical region near the vagi.

The pulse-tracings appended were taken with Marey's

sphygmograph. Fig. 10 was made under a low degree of pressure and perhaps gives the better picture of the pulse, with its high

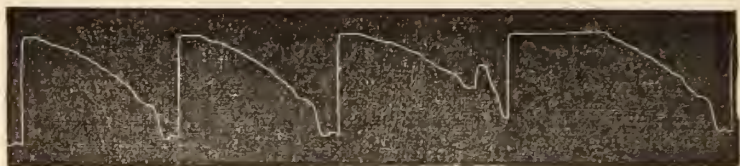


FIG. 10.

tension, and attempt at an extra beat in one place. Fig. 11 made under high pressure, shows a less normal dicotism, and an imperfect ending of the systolic impulse; tension less. Both tracings indicate a want of perfect regularity in time and form in the various beats.*

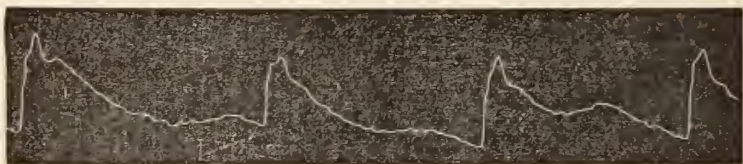


FIG. 11.

REMARKS.—This case is remarkable, but not unique. Many cases are on record in which the pulse-beats ranged from 16 to 32 per minute. My friend, Prof. Cornil, of Paris, has placed on record † an instance of 14 beats; Landois, ‡ one of 10 beats. In several of these cases (Bradbury, § C. H. Jones ||) “syncopal convulsions” and “epileptoid attacks” occurred.

The explanation of epileptoid attacks in cases of slow pulse does not appear difficult. The brain, and especially the basal masses, are rendered anæmic for too long a time. In other words, a degree of asphyxia (want of oxygen or excess of carbonic acid) is produced in these parts, and a discharge of nerve force takes place. The human being is

* The lower diastolic part of the first beat in fig. 10 is imperfect, because the lever descended too low and ran along the paper-holder for a moment.

† V. Cornil, *Comptes-Rendus de la Société de Biologie*, 1875.

‡ Landois, *Die Lehre von Arterienpuls*, 1872, p. 228.

§ Bradbury, Case of infrequent pulse and syncopal convulsions; death, autopsy. *Lancet* I, 1877, p. 493.

|| C. Handfield Jones, Lecture on slow pulse and epileptoid attacks. *Lancet* Dec. 30, 1876.

ERRATA—Through a blunder in imposing “ Fig. 10 ” has been inverted.

thus placed in a condition resembling that of the animals whose subclavian and vertebral arteries were tied by Astley Cooper, Kussmaul and Tenner. These observers first demonstrated by such experiments that anæmia of the basal parts of the encephalon will give rise to epileptoid attacks.

It is singular that in H. G. we did not observe the Cheyne-Stokes' respiration rhythm, which is believed by many to be due to temporary asphyxia of the medulla oblongata.

We might add another case of slow pulse to this contribution, but, unfortunately, the notes and tracings have been mislaid. However, I can distinctly recollect that the patient, a male, about thirty-five years of age, was apparently not disabled by the slow action of his heart, though he had been somewhat weak for months prior to being seen. The pulse beat about 32 per minute, but the patient stated that it had been slower. No cardiac disease existed in this case, and no epileptiform attacks ever occurred.

In such cases it is a matter of surprise how the system at large can become accustomed to such a slow pumping of the blood. In both patients the principal organs, except the basal region of the brain in the first case, were normal; the lungs, liver, kidneys and various glands acting as well as if they received fresh oxygenated blood sixty or seventy times per minute. Calorification and the peripheral circulation were normal. In such cases we see a wonderful example of the self-regulating and accommodating qualities of a complex organism.

The causes of slow pulse are various. Some few individuals have a normal slow rate—down to fifty or forty beats. Again in some cases of uræmic poisoning a very slow pulse may appear. Third, pressure upon the brain (clots, tumors, depressed bone) often reduce the pulse-rate and raise the tension. But none of these pathological con-

ditions can, so far as we know, bring the pulse down to the extreme figures referred to, viz., ten, fourteen, twenty-one, twenty-six or eight, or thirty per minute. Perhaps the best physiological explanation of very slow pulse is by irritation of the vagi in the neck, or more probably near their origin. In our two cases none of the above-mentioned conditions could be demonstrated.

LITHOTRITY AS PRACTISED BY THOMPSON, WITH
A DESCRIPTION OF HIS WASHING APPARATUS.

BY E. L. KEYES, M. D.,
SURGEON TO BELLEVUE HOSPITAL.

DURING a recent visit to London I had an opportunity on a number of occasions to witness the operation of lithotrity as at present performed by Sir Henry Thompson.

General interest upon this subject has of late been quite keen in America, growing out of the published successes of Professor Bigelow in litholapaxy, as he styles rapid lithotrity, his demonstration of the unsuspected tolerance of the bladder to prolonged manipulation, and the new lithotrites-evacuating tubes and washing apparatus which he has devised. The general functional excellence of Professor Bigelow's instruments has certainly impressed the surgical community in America very favorably, while the controversial articles upon these instruments and upon Professor Bigelow's views in various journals, have kept alive an interest in the subject which its importance fully justifies.

I have no intention or desire in this short communication to touch upon any point in dispute, but simply to give to the readers of the ARCHIVES a sketch of the method of operating now followed by the great English lithotritist, and at the same time to describe his recent modification of the washing apparatus, a modification which seems to unite

the varied good qualities of all the instruments which have preceded it, while avoiding their defects.

A plate of this instrument, and a description of its use, was published in a recent issue of the *London Lancet*, but no general knowledge of it exists in this country. Neither of the well known instrument-makers, Tiemann or Ford, had seen it until I showed them the sample I had brought from London, and I am not aware that it has been used before to-day by any one who had previously used Professor Bigelow's excellent instrument.

To-day I employed Thompson's instrument in a case, and as I have used Bigelow's instrument quite often, I feel at liberty to introduce the newcomer to those desiring its acquaintance, with a consciousness of a fair knowledge of its qualities, relative as well as actual.

I may remark in passing that while inspecting Thompson's cabinet of (precious) stones, I referred to his report of 500 cases of operation upon stone patients, read before the Royal Medico-Chirurgical Society, March 12, 1878. Thompson stopped me in my remark to say "it is 700 now," and the conversation proceeded.

I saw four operations in all during my stay of twelve days in London, being unable to attend others to which I was invited. All of these operations were upon private patients, men in advanced age. In each case the stone happened to be small, never larger than a marble. The composition was phosphatic in every case but one, in which the stone was formed of mixed urates and uric acid. No complications, so far as I learned, existed in any case, and all, I was told, did well after the operation.

The method may be thus briefly described: Nitrous oxide followed by ether quickly made the patient insensible. The knees on either side were held asunder by two trained nurses (female). Sir Henry's best man, Mr. Browne, oiled

a small lithotrite and handed it to the operator. The latter introduced it with unusual rapidity, quickly caught the stone and crushed; again a fragment, again and again, and withdrew the instrument, its jaws slightly loaded with debris.

Mr. Browne handed the operator another small well oiled lithotrite, and receiving the loaded one, dug out its contents, emptied them upon a sheet of paper, cleared the jaws entirely of debris by quick agitation in a basin of water, and had the instrument again oiled and ready for use by the time Sir Henry had caught four more fragments, reduced them to powder and withdrawn his second instrument with some dust in its jaws.

This process was repeated again and, I think, a fourth time in the first case, then the washing bottle was used, and the operation terminated.

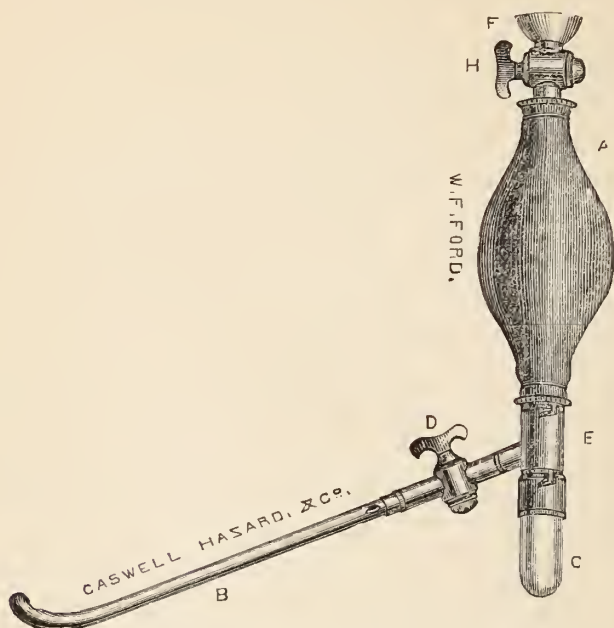
The first case was the one with a uric acid stone, as large as a small marble. The whole operation was finished inside of ten minutes.

Another case was operated upon up-stairs immediately. Both were in a sort of private hospital. This operation was terminated as promptly as the other, and I left the house with Thompson within forty minutes of the time of entering it.

A few words will serve to describe the washing apparatus, which seems to me to be a combination of all that is valuable in the instruments of Clover and Bigelow, with the addition of some new features, making it more convenient than either.

The instrument is composed of six parts, *A*, *B*, *C*, *D*, *E* and *F*. Two of these, the rubber bulb *A* and the brass filling cup *F*, are inseparably united by wire. A bayonet fastening couples the brass segment *E* to *A*, and another the glass receiver *C* to *E*. The brass segment bearing the stop-

cock *D* fits smoothly without a catch into *E*, while its distal end receives without a catch the end of the white metal catheter *B*, the latter a pretty close reproduction of Bigelow's curved evacuating instrument.



NOTE.—The stop-cock, *D*, is upside down in the cut.

To use the instrument the stop-cock *D* is turned off and the bulb filled through the metal cup *F*, after which the stop-cock *H* is turned off. A small amount of air in the top of *A* is not a matter of importance.

B is introduced into the bladder and the urine drawn off into a small vessel. The patient is not moved from the position in which the lithotrite was used. The coupling of *B* and *D* is made when, at the point of coupling, both instruments are dry and *B* full of air, the bladder being empty. *B* may be coupled so that its beak points upwards or sideways in the bladder, or it may be reversed. Now *D* is opened and *A* squeezed and relaxed just as in the Bigelow or in the Clover apparatus.

The first gush of water carries the air contained in *B* into the bladder, but the first return current sucks it out again. It mounts to the top of *A* and there remains, being no more heard or thought of during the operation, while the fragments shower down plentifully into the receiver *C*.

Thompson claims as an advantage which his wash bottle has over others, that the fragments have a shorter course into the receiver, an advantage, however, which appears to be of little importance.

The real features in which this apparatus seems to me to take the lead of that of Professor Bigelow, with which excellent instrument alone it need be compared, are four; in actual efficiency both instruments seem to be equal.

The four advantages of Thompson's instrument are :

(1.) There is no difficulty in coupling, no chance to wet the patient or the bed.

(2.) The short receiver *C* fits beautifully between the patient's thighs, making it unnecessary to move him to get room. Just as he lies for crushing he is ready for a clean washing, and the hand working the bulb above the level of the abdomen acts to great advantage and with comfort to the operator.

(3.) Air accidentally or by design filling the large evacuating catheter does not, with this instrument, swash back and forward, making a foam in the bladder and interfering with the suction power of the return stream, but quietly mounts to the top of the bulb *A* and remains there silent and unnoticed while the water below does its work.

(4.) In case the bladder has not been emptied by the evacuating catheter before it was coupled to the bulb and the latter is found to contain too much fluid, as much as may be desired can be squeezed out in a moment at *F* without uncoupling the instrument or more than momentarily arresting the washing manœuvre.

With this instrument the washing of the bladder may be effected more gently and more promptly than with any other instrument I have tried, and its use will render the wonderful patience of the bladder under prolonged manipulation, which has been so amply demonstrated by Bigelow's earlier operations, the more valuable both to the patient and to his surgeon.

A READY METHOD OF RECOGNIZING THE UPPER AND LOWER SURFACES OF A SPINAL CORD SECTION.

By R. W. AMIDON, M.D.

IN studying the spinal cord by means of transverse, horizontal sections, it is of the utmost importance, particularly in pathological cases, to know which is the right or left hand side, and whether one is looking at the upper or under surface of a section. Of so much importance is this knowledge, that some means must be employed to acquire it.

One of the best of these is a method devised by Dr. E. C. Seguin, and published in the translator's note appended to Gerlach's article on the spinal cord in the American translation of Stricker's Histology, p. 647.

He there recommends that, before placing the segment of the cord in the microtome, a slight longitudinal incision be made in the right lateral column.

By this means all the sections have a nick in the right lateral column, and can thus be easily placed.

This method, however, has many drawbacks.

One is, that it is a procedure easily forgotten during other manipulations.

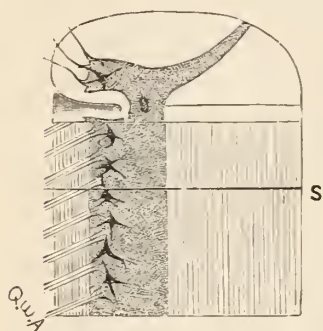
Another more important drawback is the fact that, make the incision as slight as you can, the resulting nick often

causes extensive fissures, or crumbling of the lateral column or whole section, especially in over-hardened or pathological specimens.

The requirements for determination by the method I propose are two. First, the sections must be nearly horizontal; and, secondly, they must be sufficiently well stained and transparent to demonstrate the constituent parts of myelinic nerve fibres.

The mode of determination depends entirely on the fact that the anterior roots pursue an obliquely descending course through the anterior columns, and thus horizontal sections cut the anterior rootlets obliquely. (See diagram below.)

What is the natural inference to draw from this fact?



It is this. Let the reader look at the upper surface of a transverse section of the spinal cord in the region of the anterior roots.

That is to say, he is looking *down* the anterior column.

He readily perceives that the central ends of the anterior root-fibres are nearer his eye than the peripheral ends. While the central ends are *at* the focus, the peripheral ends are *beyond* the focus, and he needs to *near* the eye to the section to see them.

This nearing of the focus also gives the fibre-bundle an apparent peripheral motion, while increasing the focal distance causes an apparent central motion.

The application of this method to chance sections is easy.

Suppose we examine the anterior columns of a section, and find by focusing that the central ends of the anterior root fibres are farther from the eye than the peripheral ends. We will immediately know we are looking *up* the cord, or at the *under* surface of the section.

Now all it is necessary to do is to turn over the section, either in your mind or with the slide, and place it with the anterior horns forward. The section is then in position.

In sections of the cord where the anterior roots do not show, the posterior roots may be used in a similar way, as they too pursue a slightly descending course. Their use is not so easy, as the fibres are short and pursue a slightly wavy course.

In sections, or fragments of sections, where neither of these means avail, a study of the course of the fibres in the anterior or white commissure will lead to detection.

The fibres of the white commissure pursue a course downward and across the median line from the base of one anterior horn into the anterior column of the opposite side.

In sections of the upper cervical region, the spinal accessory roots may be made use of, remembering, however, that they pursue a direction obliquely *upward* through the lateral columns.

Any transverse section of the medulla, in which a view is had of the roots of the eighth, sixth, seventh, fifth, fourth or third nerves, can be placed.

The auditory roots tend slightly upward. The sixth and seventh roots course decidedly downward. The fifth nerve roots run slightly upward, as do the fourth, while the third runs forward and slightly downward.

A careful study of the arciform fibres, raphe and peduncular tracts might also be of use in this connection.

EDITORIAL DEPARTMENT.

ULCERATION OF THE CERVIX UTERI.

By MATTHEW D. MANN, M.D.

The recent changes in some of our opinions in regard to the diseases, and especially the so-called "ulcerations" of the cervix uteri, have been so radical, that it may be worth while to stop and take a general review of the subject, that we may know just where we stand.

The term ulceration of the os, once included nearly all the diseased conditions of the vaginal portion of the cervix. Gradually however, with the advance in our pathological knowledge, one condition after another has been removed from this category, until now, true ulceration is classed among the rare uterine diseases. I propose to show first what the true ulcerations of the cervix are, and then to consider the nature of the conditions which have hitherto been largely confounded with true ulceration, and considered and treated as such.

The existence of *cancerous ulceration* is of too common occurrence to be questioned, such ulcers are so characteristic both in appearance and in pathological anatomy that they need no description. They are generally the last stage of a disease which has been long previously recognized.

Ulcers due to *sarcoma* are much rarer. Sarcoma does not as a rule break down and leave an ulcerated surface, but rather develops in large tumorous masses. We have met with one case* where beginning on the vagina as a small, soft, wart-like growth, the tumor very soon broke down, leaving a deep ulceration with a

* *Amer. Journal of Obstetrics*, vol. viii, p. 541.

yellowish hue, which soon spread to the cervix uteri, and gradually destroyed it, leaving only a rounded cavity where the cervix had been, and proving rapidly fatal. This case resembled very closely the cases first described by Clark, and afterwards by Rokitansky and Förster under the name of phagedenic or corroding ulcer, and on the supposition that these were cases of sarcoma may, be found an explanation of these pathological puzzles.

The occurrence of *tubercular* ulceration of the cervix independent of a similar disease of the body is affirmed by some. They suppose a condition similar to that met with in the larynx. The existence of such a condition has however been often doubted; but recent observations seem to set this question at rest. M. Cornil,* has lately presented to the Paris Hospital Society two very interesting cases which he declares are tubercle of the vagina and uterine cervix. The ulceration he describes as half a centimetre in diameter, with sharply cut borders and yellow surface. On one of the borders were three small yellow granules slightly projecting. The patient was quickly cured by applications of iodine. She was suffering from phthisis at the time. A small ulcer was also noticed in the frenum of the tongue; this quickly healed. In the other case there was a crop of whitish granulations on the cervix and in the wall of the vagina. At the necropsy general miliary tuberculosis was found. M. Cornil especially drew attention to the rarity of tuberculosis of the cervix and vagina.

M. Fournier, while recognizing the rarity of the disease in question, had seen eight or ten cases where there were ulcerations in the cervix, which were certainly not chancres. As the women were all tuberculous, he was inclined to attribute the ulcerations to this cause. He had never seen the initial tubercle.

The form most commonly met with is only a part of a general infiltration of the womb, which in turn is generally secondary to that of other organs. But even when it attacks the fundus, its extension to the cervix is very rare. The subject is still involved in considerable doubt and is deserving of study.†

* For description of a case see M. Homole, *Progrès Médical*, 1877, No. 30.

† *Brit. Med. Jour.*, May 17, 1879.

Syphilitic ulceration excluding the chancroid or soft chancre, may also be classed among the rare uterine affections. That it does occur is stated in almost every text-book ; and some have even found it to be quite common. But there are no characteristic appearances described by which we can recognize it, and the only way of making a diagnosis is by observing the effects of treatment, and by carefully studying the history of the case. That the initial lesion of syphilis may find its place in the cervix is certainly possible, but all authors agree that such an event is rare. The same is true of mucous patches and gummy tumors which, if they do occur, may possible result in ulcerations. The subject in most of the text-books is hopelessly confused, the authors as a rule, have made no distinction between the syphilitic and chancroidal ulcerations.

Scanzoni and Récamier both describe a form of ulcer which the former has called the *varicose ulcer*. It is attributed to a varicose condition of the vessels of the cervix in conjunction with a general and similar condition of the neighboring veins. Thomas affirms that this is only a complication of the granular ulcer, degeneration 4 ed., due to a stoppage of the circulation and consequent swelling of the veins of the diseased part. At a recent meeting of the N. W. Medical and Surgical Society of N. Y., my friend Dr. C. A. Leale, described a case similar to that spoken of by Scanzoni. A careful study of Scanzoni's description, together with Dr. Leale's case, fully warrants a belief in the occurrence of such a form of ulceration.

Scanzoni's description is as follows : The uterus is of a peculiar bluish-red color ; gradually spots of deep blue appear upon the vaginal portion, upon which later we recognized the venous branches in greater or less numbers, showing numerous varicose dilatations. The mucous membrane covering them gradually forms elevations, and finally the tissue becomes softened and the epithelium is detached in its whole extent, leaving an eroded surface, in which are to be seen the varicose veins. If the disease progress the loss of substance always extends further ; and

from time to time hemorrhages supervene.* This disease of the cervix occurs generally where there is some obstruction to the abdominal circulation, either through the presence of large tumors, or from heart or lung disease.

The forms of ulceration thus far mentioned are, with the exception of that due to cancer, universally admitted to be of rare occurrence. This rarity is fully corroborated by my own experience, for among more than 2,500 cases of uterine disease examined during the last six years, no cases of either tubercular, syphilitic, or varicose ulceration were met with, and only one case of sarcoma.

Chancroidal ulceration or the soft chancre, not uncommonly attacks the cervix. We have seen two cases. It pursues the same course as the same form of ulceration elsewhere. It presents the characteristic appearance of a deep ulceration with sharply cut, undermined edges, a worm-eaten base and abundant purulent secretion. The only absolutely certain test is auto-inoculation, which can be tried according to the usual method and which will render the diagnosis absolute. In our experience it heals very slowly, even after it has lost its specific character. May it not be that the "case of obstinate ulceration of the neck of the uterus," recently reported in this journal, (April, 1879, p. 165) by Dr. Amidon was of this character. The description of the sore, the history of the case, as well as the condition of the patient (prostitute) all point in this direction, as does also the intractable character of the ulceration and its cure by skin grafting. The observation of Dr. A. that such a sore, after being converted, if my hypothesis be correct, into a simple granulating ulcer, can be cured by grafting, is certainly most interesting and valuable. If, however, this form of treatment is tried on the common cases of erosion, or so called ulceration, to be described later we are certain that only disappointment and failure will result.

The *inflammatory ulcer* is one due to direct pressure, as by a wrongly placed pessary, or to friction and irritation from external causes as is commonly seen in cases of procidentia. These are usually deep'y cut, sluggish ulcers with little tendency to heal and

are easily recognized. If the parts are returned to their natural position granulations quickly spring up and the parts are soon healed. It must not be forgotten that another condition and one which may be easily confounded with these ulcers, sometimes exists with prolapsus viz : laceration and villous degeneration of the cervix. The ulcers formed by the pressure of pessaries are not very common and quickly heal when the exciting cause is withdrawn.

No mention has been made thus far of a true simple primary ulceration.* The reason for this is that such a form of ulceration is, according to the best authorities, unknown. In making this statement the various forms of erosion, abrasion and degeneration are of course put outside of the class of true ulcerations. The cases which may have been classed as true ulcers were in reality something else, perhaps chancroids, as has already been suggested, which having lost their specific characteristic appearances and presenting a perfectly healthy though sluggishly granulating surface would easily lead to the mistake.

Thus have been enumerated all the forms of ulceration of which, in the light of modern pathology, we can admit the existence. If we group them we find that they fall naturally under two heads.

SPECIFIC ULCERATION.

Cancerous,
Sarcomatous,
Syphilitic,
Chancroidal,
Tubercular

NON-SPECIFIC.

Inflammatory,
Varicose.

The pathological states of the cervix which have, until recently, been classed as ulcerations, but which are now known to have nothing in common with that condition, are of more importance than those thus far mentioned, because of their much greater frequency. I refer, of course, to the so-called erosions, excoriations and degenerations which complicate a large proportion of cases of uterine disease. The peculiar macroscopical appearances of these

conditions, with their roughened granular surfaces, generally covered with a yellowish dirty-looking secretion, certainly bear a close but superficial resemblance to ulceration. But recent observations and investigations, both clinical and pathological, have very clearly shown that they are in fact very far removed from the condition of a true ulceration.

Drs. C. Ruge and J. Veit, have examined a large number of cervixes, most of them amputated from the living woman, and have set forth the results in a long and carefully written paper.* From their investigations we gather conclusions which differ somewhat from those of the authors. For while admitting in general terms the existence of laceration of the cervix, as described by Emmet, they have not apparently recognized its existence when occurring in a slight degree in some of the cases examined and pictured by them.

There are now generally admitted to be three forms of disease of the cervix, which we can call respectively simple erosion, granular or villous degeneration and follicular degeneration.

The first of them has generally been considered to be caused by a desquamation or loss of the epithelium due to its being macerated in the discharges from the uterus or vagina. According to R. and V. however, the excoriated tissue is not devoid of epithelium, but its normal covering is replaced by a single layer of cylindrical epithelium which has taken the place of the regular flat epithelium of the parts. This accounts for the color of the affected portion. For the vessels, greatly enlarged and with their walls thinned easily show through the thin layer of cells which alone cover them and thus give to the surface its red and "raw" look. The tissue under the "erosion" is found to be thickly infiltrated with small round cells and very richly supplied with blood-vessels.

If this state is allowed to last it will soon give the second condition, viz : the granular, papillary or more properly *villous degeneration*. The epithelial layer soon shows a tendency to send out processes or prolongations into the underlying tissue, thus dividing it into distinct processes or villi. The richly cellular connective

* Zeitschr. f. Geburtshülfe u. Gynäk., ii, 1878, p. 415.

tissue between these prolongations in its turn extends its growth, thus enlarging and lengthening the villi already formed. These villi are then not the normal papillæ of the mucous membrane, as has generally been taught, nor are they deprived of epithelium. They are distinct new formations analogous to papillary or villous growths found elsewhere, in the body of the uterus and bladder for instance. If examined in their fresh state and by the proper methods they are always found to have the epithelium as described. It is only the specimens taken from the dead body which are found to be deprived of epithelium, the loss being due to putrefactive changes. The villi are well supplied with blood-vessels, which from their being very superficial and having very thin walls bleed on the slightest touch.

We see that the terms erosion and ulceration are eminently improper as applied to the conditions here described; and we see, moreover, that the "erosion" is in reality but the first stage of the villous degeneration.

These growths may go on to such an extent as to form large proliferating masses, which bear a strong resemblance to the cauliflower growths, and have often been mistaken for cancer. We have such a specimen in our possession.

The causes of this disease are not far to seek. Any irritation of the neck which is sufficient to produce a catarrh, is also sufficient to produce a greater or less degree of, what we may for convenience still call, the erosion.

This, we imagine, is not produced so much by the irritating character of the discharges, for, although the whole vaginal portion may be equally bathed by the secretions, it is at first always confined to the immediate neighborhood of the os, as by a direct extension of the same process which is going on within the canal, viz., rapid and imperfect growth of epithelium, resulting in a single layer rather than in the normal flat epithelium of the part. The extension and continuance of the same cause may, of course, result in the second stage, or villous degeneration. But by far the most common cause is the existence of a lacerated cervix. The raw surfaces of the flaps resulting from a laceration, instead of

being covered by a granulating and consequently cicatrizing surface, are quickly covered by a layer of cylindrical epithelium, which extends from the canal. This epithelium, forming but a very imperfect covering to the parts under it, is not at all sufficient to protect it in its new position from friction and irritation. As a result the formative activities of the parts are excited, the connective tissue proliferates, giving us areolar hyperplasia, and the epithelium does the same, producing a villous degeneration.

The third form of disease of the cervix which comes in our present division, is the so-called *follicular degeneration*. It has its origin in the glands of Naboth. Here we must insist on the truth of the assertion made long since by Tyler Smith and Virchow, and asserted again and again by others, and as repeatedly denied, that there are no Nabothian follicles in the healthy uterus, except within the canal. They are never normally found on the vaginal surface of the cervix. This fact has been denied because the investigators did not carefully diagnose the smaller and less noticeable cases of cervical laceration. These lacerations, even when small and otherwise unimportant, are enough to allow of a slight prolapse of the cervical mucous membrane. This, becoming spread out around the os, seems on a superficial examination to be a part of the natural covering of the cervix. In this way the examination of uteri, which were apparently perfectly healthy and normal, has been misleading. The way to avoid error is to use only specimens from nulliparous women. When this is done the follicles in question are found to be confined to the canal.

The disease consists essentially in an irritation and consequent growth, hyperplasia of the Nabothian follicles on the surface, either of a prolapsed cervical mucous membrane, or of the flaps resulting from a more marked laceration. But on this point I must insist, that to have a follicular degeneration of the cervix, there must have been a pre-existing laceration. In the early stage of the disease the follicles, which are always closed, present the appearance of vesicles the size of a pin's head, and on puncture are found to be filled with a thick mucus-like fluid. In some cases the cysts may rupture, thus forming little excavations. These

in time may heal over, or the epithelium sprouting up from many ruptured cysts may form large proliferating tumors. The two diseases, villous and follicular degeneration, may and generally do coexist.

While it is not my intention to take up here the subject of therapeutics, I cannot refrain from one remark.

It has been the regular practice, and is yet with a very large proportion of practitioners, to treat all these degenerations with active caustics. This has been done as a routine, without a sufficiently clear idea of the indications. This we now have. The newly formed and degenerated tissue must be thoroughly removed, but once this is done the use of caustics should cease. It might, moreover, be much better done, (when the new tissue is very exuberant,) by some instrument, and the caustics, which are also violent irritants, entirely dispensed with. After the growth is destroyed, the indications for active treatment cease ; then should come in the mild astringents and emollients, glycerine, hot water, etc. If this plan of treatment be followed out, much better results will be obtained than if the old plan of perpetual cauterizing applications is adhered to.

It is needless to say that, should a laceration of the cervix exist, it must be repaired before a permanent cure can be expected.

NEW BOOKS AND INSTRUMENTS.

Syphilis of the Brain and Spinal Cord. By THOMAS STRETCH DOWSE, M.D., F. R. C. P. E., pp. 140. G. P. Putnam's Sons, New York, 1879.

Dr. Dowse after giving a brief historical sketch, opens his work with some general remarks on the theory of constitutional syphilis, in which he mainly adopts the position taken by Hutchinson. His second, third and fourth chapters deal respectively with the diagnosis of syphilis of the central nervous and sympathetic systems, as well as of the peripheral nerves. Naturally the writer is clearest in treating of cerebral syphilis, his formulations being sound, and a vast experience having enabled him to collate numerous points bearing on the differential diagnosis. The fact that, as stated by himself, Dr. Dowse has made over one thousand cerebral autopsies, renders his opinions in this respect of especial value. Regarding a single point however, we are not able to coincide with him. On page 18 he states: "it must not be forgotten that apoplexy does occur in association with gumma and with arterial changes, but there are always prodromata which the practical senses can detect long before the event arrives." This in our opinion does not enable us as the author infers, to distinguish apoplexy occurring in syphilitic subjects from the same in non-syphilitic ones, as there are many cases of non-luetic softening and arterial degeneration followed by hemorrhage, in which there are prodromata, closely resembling in every character those referred to by the author as occurring in syphilitic subjects. Many will also take issue, where as on p. 83, he holds that primary idiopathic epilepsies are more

due to hereditary syphilis than they are to any other cause. This extreme view is evidently due to a bias which the author seems to be laboring under, in regard to a supposed identity of "scrofula" and syphilis.

Among the numerous interesting cases related, we notice as unique, one of a syphilitic neoplasm, invading and obliterating the torcular Herophilii as well as the larger sinuses leading to it; and as possessing a special value, two instances of (evidently gummatus) cerebro-spinal meningitis, and several of cortical gummata, associated with symptoms favorable to the views of the localizationist. The case of "syphilitic" congestion of the cord, is, however, not a very clear one.

His experience as an alienist has enabled him to discuss the relation of syphilis to mental disease quite fully. He does not however, refer to the occurrence of acute mania with the syphilitic fever, although several such cases have been reported by Tuke. Deserved prominence is given to the intimate relations borne by syphilis to general paralysis of the insane, and in the course of some general remarks on the latter affection, the author makes a statement which we can endorse to a certain extent, although it is at variance with the current drift of opinion. On page 129 he says: "I am inclined to doubt that any time really exists in general paralysis of the insane, where ideation and volition not only become co-incidentally involved in the most incipient stage, but that the progressive degenerations are perfectly symmetrical and synchronous in their psychical and volitional manifestations."

There are undoubtedly cases which, in the progress of the symptoms are either chiefly ascending (spinal-cerebral) or descending (cerebral-spinal), especially in syphilis do we often find the first *marked* symptoms to be spinal although mental ones coexist, while in typical paresis, the first pronounced symptoms are mental.

This little volume, dedicated to an American physician, (Dr. Wm. A. Hammond), is gotten up very neatly by the publishers, and is amply illustrated by chromolithographs, photographs and woodcuts, illustrating the retinal, arterial, and gummy changes of syphilis. It is difficult to see why a photograph of syphilitic rectal disease was introduced. The author exhibits a tendency to abstract and controversial psychology in many places, but in the main he is concise and practical, especially in his therapeutical chapter. His book will therefore prove useful reading to many.

[E. C. SP.]

Studies in Pathological Anatomy. By FRANCIS DELAFIELD, M. D., Adjunct Professor of Pathology and Practical Medicine, College of Physicians and Surgeons, New York. Nos. 1-10 inclusive. New York, Wm. Wood & Co., 1878.

Dr. Delafield designs in these "Studies" to publish monthly a small fasciculus containing from two to four full-page drawings, with about the same number of pages of accompanying text, and he proposes that the particular subjects of study shall be inflammation of connective tissue, of mucous membrane and of the viscera, and the structure of tumors. It is intended that the first twelve parts shall embrace the pathological anatomy of pleuritis, of peritonitis and of meningitis.

The papers embody the results of original investigations which the author has carried on for years, and which he now thinks are sufficiently extensive and positive to justify publication. The drawings which illustrate the text are from the author's own pencil, and are claimed to be faithful reproductions made by the aid of the camera, of actual specimens under the microscope. Some of the illustrations are imprints from wood, others have been produced by photographic process.

The work is from the letter-press of Wm. Wood & Co., of New York; and in the style of paper, of type and in the excellence of the imprint, nothing is left to be desired.

In presenting the results of his labors to the public, the author, with an assumption of modesty perhaps unwarranted, declares that he desires to add to the fragmentary and contradictory knowledge of the subject, another "piece of patchwork."

In the first fasciculus he, in a few paragraphs, presents his views of the intimate structure of connective tissue, and offers a classification of the various inflammatory changes which it suffers. The four succeeding fasciculi contain a brief description of the normal histology of the pleura and of the morbid processes at work in inflammation of the serous membranes.

In Nos. 6, 7 and 8 attention is devoted to the histology and to the different forms of inflammation of the peritoneum. In Nos. 9 and 10, the author has allowed himself to be diverted from the original plan as marked out in his preface, and has considered the minute anatomy of the lungs and entered upon the pathological histology of pneumonia, having postponed for the present the orderly examination of the serous cavities.

On the whole the author deserves to be highly commended for the excellence and accuracy of the drawings, upon which he has doubt-

less spent much time. There are, however, among these several which not only do not favorably compare with the best, but which in some details are so crudely executed and so smeary in appearance as to greatly mar this part of the author's labor. Again, a few others are so wanting in sharpness that the student who gets his first impression of pathological histology from a study of such illustrations, can scarcely fail to receive a distorted idea of the conditions which they so falsely pretend to represent. Among the former pls. xi, xxx, xxxii, and among the latter pls. x and xxix, may be indicated.

The text of the author calls for a similar measure of praise and condemnation. His views are generally expressed tersely and in well-chosen language. Yet they often meet their self-contradiction, sometimes even before the page is passed. As fair examples of this "patchwork" of conflicting opinions with which the author himself has presented us, the following citation may be introduced :

On page 9 the statement is made, that "tubercle is a permanent inflammatory product," yet in the very next sentence we see that "when once formed" it may be "transformed into ordinary connective tissue." And again we find on page 42, that (in acute peritonitis) "connective tissue cells form permanent new tissue," and in the second paragraph below we are met by the assertion that "the connective tissue cells are multiplied, but they do not go out to form permanent new tissue." However, the apparent carelessness with which the pieces of this "patchwork" have sometimes been thrown together meets its parallel occasionally in ambiguous and ungrammatical sentences. "The lesions may be superficial or may infiltrate the subperitoneal tissue." See page 41.

Notwithstanding the fact that the short-comings and imperfections of his work are many and glaring, Dr. Delafield may feel gratified at having succeeded in making a contribution to medical literature, which in many respects is of real and permanent value. His original and systematic study, by experiments upon the lower animals and observations in the human being, of the nature of the different forms of pleuritis and of peritonitis, has been in the main carefully and conscientiously done. But whatever may become of his opinions concerning the nature of the inflammatory processes which he has studied, he may feel assured that the best of his drawings will remain a lasting evidence of his ability to scrutinize closely and to faithfully represent what he sees under the microscope. They at least, will be safe to put into the hands of the

student who desires a truthful ocular picture of what the microscope should reveal to the eye. Perhaps the text also when it is properly presented to the understanding of the pupil by a competent interpreter in the person of a preceptor or an instructor may not greatly mislead. In a word, we consider these "studies" of Dr. Delafield of far more value to the accomplished histologist than to the tyro in pathology, whether the latter be a student in medicine or a practicing physician.

[E. O. S.]

The Principles and Practice of Gynæcology, by THOMAS ADDIS EMMET, M.D. 8vo. pp. 855. Phila. H. C. Lea, 1879.

From the high reputation of the author, Dr. Emmet's book was secure of a hearty welcome from the moment of its first announcement. Nor has it disappointed the anticipations of his friends. As the record of an experience such as is seldom given to one man, it must always stand as a classic in gynæcological literature. Dr. Emmet differs in his views from many other authorities, but as his views are all based on a foundation of careful observation and generally sound induction they are worthy of thoughtful consideration for the already learned specialist, and are a safe guide to those who have their opinions yet to form. While it is elementary in its character, it is hardly the book for the beginner, and even the general practitioner whose interest in diseases of women is slight, and whose practice in that direction is limited, will find more of profit in a much less extensive treatise. But to those who are especially interested in the subject, this work will prove a perfect mine, to be worked over and over, always with the certainty of finding more new and hitherto hidden treasure.

To give an idea of the scope of the work would be scarcely possible in our limited space. Sufficient is it to say that the whole field is thoughtfully and carefully gone over. There are some peculiarities which will at once strike the reader. The terms metritis and endometritis do not occur, and all inflammatory action in the uterus, except as a sequence of parturition is denied (p. 81). In many respects the pathology of Dr. Emmet is weak, and did we wish to attack the book this would certainly be the point we should seize upon. While the more strictly medical portions of uterine disease are fully and carefully elaborated, it is in surgical sections that the greatest amount of valuable information is contained. As an operator Dr. Emmet has always been *facile princeps*. His methods have also been tried, and from a long experience he is able to speak positively as to their value. The

man who has done the operation for vesico-vaginal fistula 400 times is certainly entitled to speak with authority.

The arrangement of the work is not such as to make it convenient for reference, but is certainly quite original. The drawings are nearly all new, and add very much to the elucidation of the text. There are several points wherein we do not agree with Dr. E., as for instance in the treatment of fibroids and in the much disputed question of stenosis after amputation of the cervix by galvano-cautery, but these are questions which are open to dispute and the author certainly makes his side a strong one. The chapter on cellulitis is particularly valuable and should be carefully studied by every one treating diseases of women. As might be expected the subject of cervical laceration is fully considered and its importance insisted on. This is really the only text-book which does much more than mention the subject. The general make-up of the book is good although some of the plates have been spoiled in the printing.

[M. D. M.]

Pott's Disease : its Pathology and Mechanical Treatment, with Remarks on Rotary Lateral Curvature. By NEWTON M. SHAFFER, M. D., etc. 8vo, pp. 82. G. P. Putnam's Sons, New York, 1879.

This little book discusses a number of interesting points in the pathology and treatment of Pott's disease, and, coming as it does from the pen of an enthusiastic, industrious and ingenious orthopædic surgeon, it cannot fail to attract much notice.

Autopsies are but rarely made in cases of Pott's disease, especially in the early stages, and the author wisely resorts for additional material to analogous diseases of the large joints, of which fresh specimens, at comparatively early stages, are sometimes obtained through amputations and resections.

Clinically he finds in most cases an earlier stage of the disease than has been recognized hitherto, preceding all symptoms of pain and deformity, and marked by "indifference to ordinary amusements ;" this he apparently considers as indicating rather a condition antecedent to local changes, than to local changes themselves. This stage is, however, often overlooked. The second stage is that of pain, most frequently at the periphery of the spinal nerves, which generally has been attributed to irritation of these nerves as they pass through the foramina, but Dr. Shaffer questions whether this "gastralgia" in all cases arises from that cause, since the inflammatory focus does not always involve the parts con-

tiguous to the foramina. This pain is associated with or preceded by spasm of the spinal muscles, giving rise to a feeling of distressing apprehension difficult to define. This spasm continues day and night, and yields "to profound anæsthesia only." The author calls it tetanoid spasm, and observes that it leaves on the patient evidences of severe suffering, such as do not follow affections of the synovial membrane and cartilage. The third stage is that of deformity. Formation of abscesses constitutes the fourth stage, but often this is wanting. Early suppuration (say when an abscess appears within a year) he considers indicative of a timely and favorable result. Absence of it, or its late appearance, under which circumstances the pus is thin and shreddy, is unfavorable, and indicates "*caries sicca*" of the Germans, usually giving rise secondarily to atonic suppuration. The suppurative form of the disease is, generally speaking, characterized by acute pain; the dry form, by pain of apprehensive character, at times becoming acute, and by more marked muscular spasm. In the former the deformity is of the angular type strictly speaking, in the latter it is more rounded. The dry form occurs more frequently in the dorsal region than in the cervical and lumbar put together. As causes of death, septicæmia and amyloid degeneration are associated with the suppurative, tubercular meningitis with the dry form.

We must refer the reader to the book itself for some original and suggestive remarks on lateral curvature, as being but indirectly connected with the main subject.

The author believes that with few exceptions, typical Pott's disease is originally a chronic osteitis, and that the peculiar symptoms are due to the fact that the bodies of the vertebræ are abundantly supplied with vessels and nerves. He remarks on the absence, in diseases affecting only cartilage and synovial membrane, of a variety of neural manifestations, pain, persistent and involuntary muscular spasm, pronounced and direct atrophy of the muscles thus affected, an agonizing and piercing nocturnal cry, and a peculiar expression of suffering.

With this pathological study as a basis the author proceeds to build up his chapter on treatment and wisely deplores the short-sightedness of those "who ignore the pathology and then devise a treatment," * * * "who have apparently looked upon the distorted spine as a mechanic would contemplate a curved metallic bar which required only a certain degree of force to straighten it." He exposes the fallacy of attempting to keep up extension of the diseased part of the spine or to extend it at all except under etherization which, he maintains, is a dangerous procedure.

He is a vigorous advocate of the theory of antero-posterior support and we only regret that in a chapter on the treatment of Pott's disease, the methods of carrying out this treatment should have received so little attention. For though he says "the difficulties in the way of successfully treating Pott's disease are sometimes very great," he speaks in detail of but few of them, with the exception of those which he has devised apparatus to overcome. In themselves these inventions are certainly excellent. The novice in orthopædics will find plenty of advice about a wrong way of treating his patients but comparatively little about the right way, and he will hardly avoid thinking that the author has fallen into the error against which he gave a warning at the outset. The many interesting points in the chapter are seriously injured by the fact, that taken altogether it is a somewhat unsatisfactory polemic against the plaster of Paris jacket. The author succeeds in controverting "the exaggerated statements of the foremost partizans of the plaster treatment," but leaves untouched the position of those who think they find a use in the jacket, though they do not believe in the original theory of its inventors. None of them will give up using the jacket, merely because the extension treatment in general is proved worse than useless. They will be led to ask whether the jacket may not really act, not through extension as has been supposed, but by affording an antero-posterior support.

When told that plaster cannot be carried above the axilla, they will look out for something to attach to it that can be carried up instead.

When reminded of the objections to the suspension of patients to apply or renew a jacket, they will inquire if suspension is a necessary part of the process. While recognizing the force of Dr. Shaffer's objections on the score of cleanliness, etc., they will study whether the advantages of a plastic may not to a certain extent overbalance these objections, especially when they find him using a smaller jacket of the same kind under the name of a "zone."

The eight cases which close the book are judiciously selected and well reported, and give together an excellent idea of the course Pott's disease may take when treated in a thorough and intelligent manner.

Certain local allusions seem to us out of taste. We are not edified by recalling the improper behavior of one of our profession "not long ago," or by dark references in quotations to "demonstrations" of spinal curvatures, to "pad plates," "hinges," "screws" and "aprons."

If the author had simply undertaken to write a book and not to enlarge a medical society paper, it is quite likely that he would not have put in some of the parts of this work which are open to criticism. As it is, we think they detract seriously from a valuable contribution to the study of Pott's disease.

[C. J. P.]

The Pathological Anatomy of the Ear. By HERMAN SCHWARTZE, M. D., Professor in the University of Halle. Translated by J. ORNE GREEN, A. M., M. D., Aural Surgeon, Boston City Hospital; Clinical Instructor in Otology in Harvard University. pp. 174. Boston: Houghton, Osgood & Co., 1878.

It always affords the critic great pleasure to be able to recommend a book without reserve and find nothing but praise for every part constituting the work. The volume before us, Schwartz's *Pathological Anatomy of the Ear*, deserves such consummate approbation. It is a new production, gathering for the first time all the facts concerning the pathology of the ear, and representing the actual state of an important branch of medical science with point and directness. Such work cannot be too highly rated, inasmuch as by the systematic arrangement of facts disseminated throughout a vast literature but pertaining to one subject, a new discipline is in reality created. The careful study of the treatise must lead the practical otologist into new paths, urge him to relinquish traditional modes of treatment, and adapt his therapeutic measures to actual pathological conditions, while to the investigating pathologist it will exhibit the deficiencies of a new discipline and present at a glance the problems yet to be solved.

The first or introductory chapter of the book deals with the literature and history of the subject, and furnishes some directions for the dissection of the ear. The following eight chapters treat respectively of the temporal bone in general, the auricle, the external meatus, the drum membrane, the tympanum, the Eustachian tube, the mastoid process, and the inner ear and auditory nerve. The woodcuts are very numerous, and illustrate the macroscopic appearances of the more important pathological alterations, but represent no microscopic conditions.

In the English form the book is far from faultless. The care and accuracy which characterize the author's work form a striking contrast with the translator's reckless rendering. It is impossible to place before our readers everything that is amiss in Dr. Green's version of Schwartz's excellent book, but we consider ourselves obliged to present enough material to justify our condemnation of such literary efforts.

Dr. Green translates : *Lichtbrechung*, Opacity ; *Lichtbrechend*, Opaque ; *Verschmalerung*, Diminution ; *Aufhebung*, Diminution ; *Kugelig*, Oval ; *Kugelig*, Round ; *Balken*, Processes ; *Züge*, Processes ; *Abschnürung*, Loop ; *Wandständig*, Encapsuled ; *Belasten*, Touch ; *Streifenförmiger Lichtreflex*, Striated light-reflex ; *Körnchenzellen*, Nucleated cells ; *Körnchenhaufen*, Collections of nuclei ; *Die knöcherne untere muschel*, the lower nasal cartilages, etc.

[E. G.]

Etudes cliniques sur les Lésions corticales des hémisphères cérébraux. Par le Dr. HENRY C. DE BOYER, late Interne of Paris Hospital's, etc., etc. pp. 230. V. A. Delahaye : Paris, 1879.

A book on this subject and from Paris cannot fail to attract attention, and its perusal will repay those here who for a long time have looked at the French school as the most advanced in neurological medicine, especially in its clinico-pathological aspect.

A brief summary of our existing knowledge of the subject is contained in the chapters on the anatomy and physiology of the convolutions.

The author's plan of superimposing on the same diagram the areas of different lesions which caused no motor symptoms, is an ingenious way of indirectly mapping out the motor region of the brain.

The article on aphasia is illustrated with twenty-two interesting cases.

With the method of "superposition," as the author calls it, he also summarises the chapters on the motor region of the cerebrum which are based upon cases of mono-spasm, monoplegia, hemiplegia and mixed cases.

The cases throughout the book are fully illustrated by plain but expressive diagrams modified from Ecker.

The whole book shows painstaking, impartial and scientific work fully earning for itself a place beside Ferrier and Charcot.

[R. W. A.]

Clinical Lectures on Diseases Peculiar to Women
By LOMBE ATTHILL, M. D., Univ. Dubl. 5th Ed., pp. 305. Philadelphia. Lindsay & Blakiston, 1879.

When a book reaches its fifth edition, it is a pretty sure sign that it is a good one. Dr. Atthill's work having reached this position is really beyond the reach of his reviewer ; and yet, in spite of its general excellence, it has certain serious deficiencies. New

ideas travel slowly, especially where they have to go from America to Europe. Before another edition is reached we hope that Dr. Emmet's book will have been studied and his ideas have made some impression on the other side, and that they will find recognition in such works as that now before us. But notwithstanding its obvious defects, it is a most excellent little work, and one which we can unhesitatingly recommend as a handy reference book.

[M. D. M.]

Handbuch der Frauenkrankheiten. Redgt. von DR. TH. BILLROTH. 7te Abschn. Die Krankheiten der Vagina, von DR. A. BREISKY, Prof. in Prag. pp. 165. Stuttgart, 1879.

Up to the present, German literature has not possessed a single good treatise on gynæcology. To supply this deficiency, Prof. Billroth has undertaken to edit a complete system of gynæcology and for this purpose has enlisted the best talent in Germany. The volume before us is by Prof. Breisky of Prague, one of the most active and advanced of German gynæcologists. It is devoted entirely to diseases of the vagina. The author shows a becoming familiarity with both home and foreign literature, and has given us what is on the whole the most complete existing treatise on the subject.

Judging from this and the other volumes which have appeared* This series will be a veritable encyclopedia of gynæcology.

[M. D. M.]

L'Hematocele Peri-Uterine. Thèse par le Dr. A. PONCET (de Lyon) pp. 195. Paris, 1878.

Peri-Uterine Hematocele is the subject of a very valuable thesis by Dr. A. Poncet. In it he considers both the intra and extra-peritoneal forms. His thesis is enriched by a number of very interesting experiments, the results of a few of which we can mention.

He finds the capacity of the pelvis, all the organs dry, in place, and the bladder and rectum empty, to be about 400-450 grams of water. The capacity of Douglas cul-de-sac, the uterus dry, lightly raised and held, is about 300 grams. If the uterus is bent forwards to the symphysis pubis it is 400 grams. In order to find out why in some cases blood effused into the peritoneum is rapidly absorbed, and on others becomes encysted, he made a large number of experiments on animals. But in all his cases the blood was

* (Diseases of the Urethra and Bladder, by Prof. Winckel. Disease of the External Genitals, by Prof. Hildebrandt. Disease of the Ovaries, by Dr. Ols-hausen ; and The New Growths of the Uterus, by Dr. Gusserow).

very quickly absorbed, so that at the autopsy no traces of it could be found. He is obliged, therefore, to fall back on some unknown and peculiar state of the peritoneum which prevents the absorption of the effused blood. The whole thesis is full of interest and contains in available form about all that is known on the subject.

[M. D. M.]

The National Dispensatory. By ALFRED STILLÉ, M. D., and JOHN M. MAISCH, Ph. D. 8vo, pp. 1628. Phila., Henry C. Lee & Co., 1879.

This admirable work needs no extended notice. While some minor points might be made the object of criticism, the general arrangement of the work, its completeness, and the facilities it affords to students and practitioners for rapidly acquiring reliable information, demand that we should heartily recommend it. The only serious defect in *The Dispensatory* is the omission of the doses according to the metric system. We are now in a transition period, when works like this should give at least the metric equivalents in parentheses.

[E. C. S.]

Posological Tables, etc. By CHARLES RICE, Chemist. 12mo, pp. 96. New York, William Wood & Co., 1879.

Mr. Rice has bestowed a great amount of labor upon this little book. Its contents are alphabetically arranged, and the doses of the active ingredients are judiciously given, with a commendable error toward the minimum in some cases (aconitia). The utility of the manual is fatally marred, in our opinion, by the failure to give doses in metric weights and measures throughout. Mr. Rice, we know, uses the metric system in his private work, such as quantitative urinary analysis, and it seems a pity that he should have yielded to conservative influences in this matter. It will be but a few years when all physicians will use the metric system, and our students should *now* have it taught them.

[E. C. S.]

Photographic Illustrations of Skin Diseases. By GEORGE HENRY FOX, A. M., M. D., etc. To be published in twelve parts. Parts I and II, 4to. New York, E. B. Treat, 1879.

The first two parts of Dr. Fox's work contains eight plates representing Comedo, Acne vulgaris, Lepra tuberosa, Elephantiasis, Keloid, Rosacea, Psoriasis nummulata, and Ichthyosis simplex. The illustrations are admirable, and the text brief but perhaps sufficient. If the entire work is completed in the same artistic manner it will be a credit to Dr. Fox as a dermatologist and to American medical literature.

[E. C. S.]

ABSTRACTS AND SUMMARIES.

Recent Contributions to Sphygmographic Science.

The most valuable recent contributions to this comparatively new branch of medical science, have been made by Dr. A. T. Keyt. His papers present purely original work, and they are as follows :

1. *The New Sphygmograph*.—Paper read before the American Medical Association, May, 1875 ; abstract in *N. Y. Medical Record*, May 22, 1875 ; published in full in *N. Y. Medical Journal*, January, 1876, and *Cincinnati Clinic*, April 29, 1876.

2. *Cardiographic and Sphygmographic Studies* ; with demonstrations of the Form, Relationship and Chronometry of the Cardiac and Arterial Movements, and interpretations of the graphic curves.—*N. Y. Medical Journal*, July, 1877, and *Cincinnati Clinic*, Aug. 25 and Sept. 1, 1877.

3. *Cardiographic and Sphygmographic Studies* ; demonstrating the time-differences of pulse-wave between different arteries ; duration of the heart-carotid, and presphygmic intervals ; time relations of secondary waves, and the velocity of pulse-wave along different arteries.—*N. Y. Med. Jour.*, Feb'y, 1878 ; *Clinic*, Apr. 13, 1878.

4. *The Human Heart's Revolution, and Relation to it and each other of Ventricular Systole and Diastole*.—*N. Y. Med. Jour.*, July, 1878 ; *Cin. Lancet and Clinic*, Aug. 31, 1878.

5. *The Velocity of the Pulse-Wave and Duration of the Ventricular-Carotid, and Ventricular-Presphygmic intervals in Young Children*.—*N. Y. Med. Jour.*, July, 1878 ; *Cin. Lancet and Clinic*, Aug. 31, 1878.

6. *Observations on Bertha Von Hillern's Pulse.*—*Cin. Clinic*, Apr. 20, 1878.

7. *O'Leary's Pulsations.*—*Cin. Lancet and Clinic*, July 13, 1878.

8. *The Pulsations of the Fontanel; their Form and Mechanism, and Relations to the Pulsations of the Heart and Arteries and Movements of Respiration.*—*Cin. Lancet and Clinic*, Sept. 21, 1878.

9. *The Influence of Muscular Exercise upon the Arterial and Cardiac Pulsations.*—*Cin. Lancet and Clinic*, Nov. 2, 1878.

10. *The Sphygmographic Indications of Heart Disease—Mitral Regurgitation.*—*Lancet and Clinic*, March 22, 1879.

11. *The Sphygmographic Indications of Heart Disease—Aortic Obstruction.*—*Lancet and Clinic*, April 19, 1879.

11. *The Influence of the Respiration upon the Form, Rhythm and Succession of the Cardiac and Arterial Pulse-Curves.*—*Lancet and Clinic*, June 7, 1879.

The instrument used by Dr. Keyt is one invented and perfected by himself. It consists of two uniform sphygmographs and a chronograph arranged and combined in one apparatus, so that one writes its record above the other upon the same smoked glass tablet. The sphygmographs receive the pulsations through the media of elastic membranes, and a column of alcohol above each membrane conveys them to the writing levers. The chronograph runs by clock-work, and writes fifths of seconds. By means of this combined instrument the pulsations at two different points can be simultaneously traced, their characters studied and compared, and their time relations determined. Without further description it may be said that the work of the instrument furnishes ample proof of its efficiency and accuracy. By no other instrument known to the profession could such results have been obtained. Fig. 1 shows exactly the principle of the instrument, although the details of construction, as since improved by the inventor, differ considerably from this representation.

The articles are all illustrated with original actual tracings from which the author formulates his conclusions. The plates, with tracings of superior excellence and appropriate markings, show the results of the various experiments, and exhibit on their face incontestible proofs of the fidelity of the work. A few plates are here reproduced to show the method and style of the illustrations.

The following is a summary of the facts and conclusions announced :

1. In the normal human cardiogram, ventricular systole begins at the lowest point of the main ascending line, and changes

into diastole at the highest point of the main descending line. In very fine cardiograms there are three waves at the top pertaining to systole, and three at the bottom pertaining to diastole. The systolic up-stroke and first wave are interpreted as caused by the commencing contraction of the ventricle and discharge of blood therefrom, and the two subsequent waves by the sustained ventricular contraction under the resistance to the escape of blood as the aorta becomes filled. The diastolic down-stroke is interpreted as produced by the relaxation of the ventricle, the first rise by the refilling of the ventricle, and the two subsequent small waves by auricular contraction and discharge.

2. In the normal arterial trace there are three major waves and three minor ones—the latter, however, very imperfectly shown. They are interpreted as produced, the first by the first blood driven from the ventricle, the second by the last blood driven from the ventricle, and the third, which is a double wave, by the shock and rebound from the closure

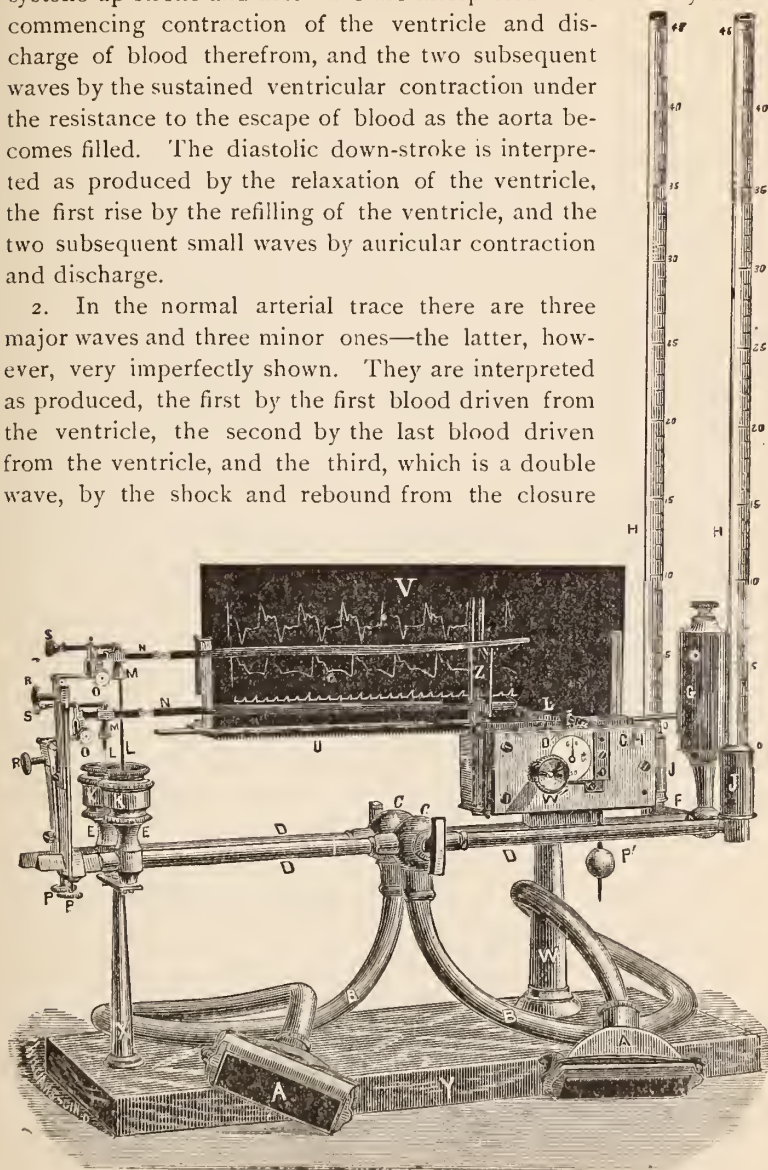


FIG. 1.

of the aortic valves. The minor waves are occasioned successively by auricular contraction, auricular discharge, and the first shock of ventricular contraction, these influences being transmitted to the closed aorta. Thus the first two are ventricular systolic, and the third, or aortic, and the minor waves are ventricular diastolic. The first is as much a fluent, or "tidal" wave, as the second. The term "percussion or shock," as applied to the first pulse-wave, is discarded as conveying an erroneous idea.

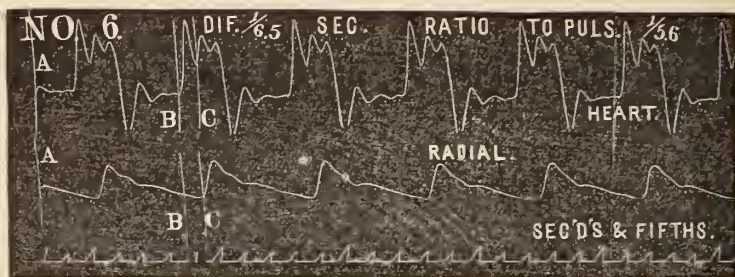


FIG. 2.

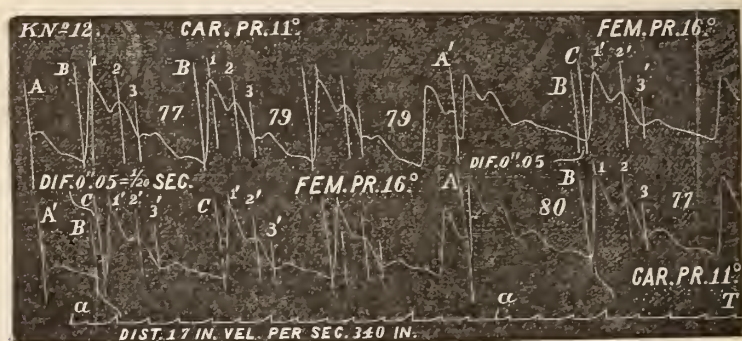


FIG. 3.

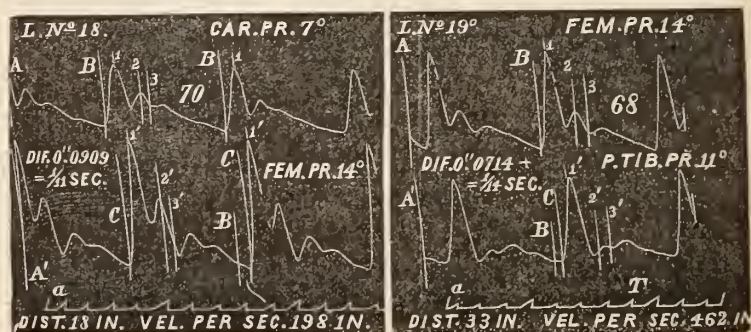


FIG. 4.

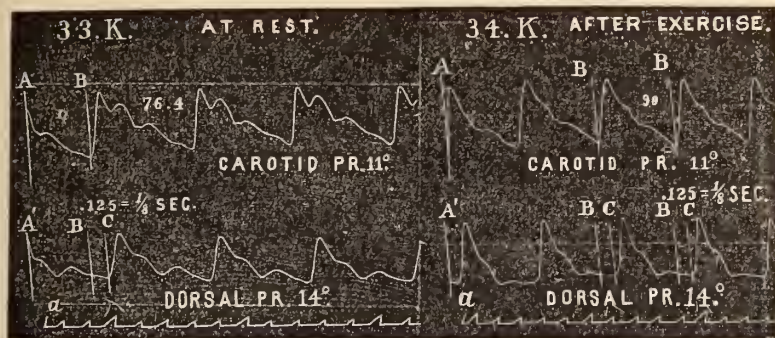


FIG. 5.

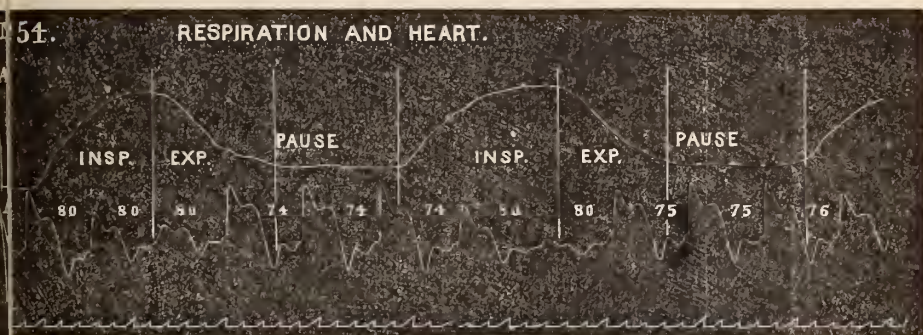


FIG. 6.

Time-differences.

3. The average time-difference between the beginning of the carpalto dise and the beginning of the dorsalis pedis pulse is .1458 second.

4. The average carotid-femoral time-difference, .0704 second.

5. The average femoral-dorsalis pedis time-difference, .0732 second.

6. The average carotid-radial time-difference, .0797 second.

7. The average radial-dorsalis pedis time-difference, .058 second.

8. The average femoral-radial time-difference, little or none.

9. The average ventricular-carotid time-difference, .0884 second, with pulse at 72 per minute.

10. The average ventricular-carotid transit time, .0279 second.

11. The average ventricular presphygmie interval, or time between the beginning of ventricular contraction and that of aortic expansion is .0605 of second, with pulse at 72.

Velocities of the pulse-wave.

12. The mean average velocity of the pulse-wave from the carotid point to the dorsalis-pedis, 361 inches per second.

13. The same from the carotid to femoral is 269 inches per second.

14. The same from the femoral to dorsalis pedis is 464 inches per second.

15. The same from the carotid to radial is 290 inches per second.

Corollaries.

16. The rate of transmission of the pulse-wave along different portions of the arterial tree is not uniform, but considerably diverse.

17. The rate is minimum for the aorta, maximum for the arteries of the lower extremity, and intermediate for those of the upper extremity.

18. Along the same arterial line the rate increases as the distance from the heart increases.

19. In the same healthy individual, in the same arteries, the rate is subject to a limited variation.

20. In different healthy individuals, in the same arteries, the rate is subject to marked diversity, of which the widest is in the aorta.

21. Both in the same and different healthy individuals, the presphygmie portion of the systole of the ventricle is liable to considerable variation.

Time-Relations of the Secondary Waves.

22. The interval between the beginning of the pulse and its acme of expansion is the same in all parts of the arterial system.

23. In certain conditions of the vessels and circulation the second wave keeps close time with the first in the onward flight, while in certain other conditions of the same the second falls notably behind the first in the progress from the heart.

24. The aortic wave rises later in the distal than in the proximal pulses, and latest in the pulse most distant from the heart.

Phenomena in Young Children.

25. The mean velocity of the pulse wave in the arterial tree is much slower in young children than in adults.

26. In such comparison the greatest diversity is in the lower extremities, where the velocity of the pulse-wave in young children does not exceed one-half that in adults.

27. While in adults the velocity of the pulse-wave is much faster in the lower extremities than in the trunk and upper extremities, in young children such difference does not obtain.

28. The mean velocity of the pulse-wave increases with age. (Inference.)

29. The time-difference between the beat of the heart and the carotid pulse is nearly the same in young children as adults.

30. The presphygmic interval is notably less in young children than in adults.

Rhythmic Changes and their Influence.

31. The velocity of the pulse-wave is not appreciably modified by changes of pulse rhythm.

32. The velocity of the pulse-wave normal to the individual is closely preserved under ordinary physiological variations of the circulation.

33. The presphygmic interval changes with changes of rhythm, the period being longer with rare and shorter with frequent pulsations.

34. In the normal heart the rhythm of its movements is continually changing, and the variation pertains to the duration of its entire revolution, and to that of both systole and diastole.

35. The duration of diastole changes in much greater degree than that of systole.

36. A longer systole may go with a shorter pulsation, and a shorter systole with a longer pulsation.

37. Invariably a longer diastole goes with a longer pulsation, and a shorter diastole with a shorter pulsation.

38. In the normal heart, beating at about 75 to the minute, the average ratio of systole to diastole is very nearly as 2 to 3; and the average ratio of the cardiac systolic portion of the pulse to the cardiac diastolic is closely as 1 to 2.

39. The cardiac systolic portion of the pulse compared with the cardiac diastolic portion increases with increase of pulse frequency.

The Fontanel.

40. The fontanel pulsates in unison with the heart ; the basal line and amplitude of its trace fall in inspiration and rise in expiration : its pulsation begins as early as that of the temporal artery in front of the auditory meatus.

The Influence of Respiration.

41. The respiration greatly modifies the form of heart traces ; the more perfect cardiograms being traced during the respiratory pause, while very imperfect or illegible ones are traced during the respiratory act.

42. Inspiration depresses the basal line, depresses the amplitude, and accelerates the pulse ; while expiration raises the basal line, raises the amplitude, and slows the pulse.

43. The stages of respiration have no appreciable effect upon the duration of the heart-carotid intervals, nor on the velocity of the pulse-wave along the upper extremity.

Heart Disease.

44. In mitral regurgitation the arterial pulse, as respects the beginning of cardiac systole, is markedly delayed. In this condition a variety of pulse-forms are present, and no special form of cardiac or arterial trace is characteristic.

45. In aortic stenosis the formula is : Heart's pulsation with sustained systole ; arterial pulsation with sloping ascent and rounded or flattened top ; interval between beginning of cardiac systole and beginning of arterial pulse, normal.

46. In the condition of heavy aortic valves without stenosis, the formula is : Heart's pulsation with sustained systole ; arterial pulsation well formed ; interval between beginning of cardiac systole and beginning of arterial pulse, abnormally long.

47. In the conjoined condition of stenosis and heavy valves, the formula is : Heart's pulsation with sustained systole ; arterial pulsation both typically deformed and abnormally delayed after the beginning of cardiac systole.

The author announces his intention to publish more on the sphygmographic indications of heart disease, and that he has a paper ready on the sphygmographic features of aneurism.

[A. B. ISHAM, M.D., Professor of Physiology in the Cincinnati College of Medicine and Surgery.]

Linear Operation for Cataract. There is probably no subject which seems to a superficial observer of no great consequence, which has been so earnestly and even hotly discussed as the exact position of the incision in the operation for extraction of cataract. Previous to the time of von Graefe the flap operation, made with a broad triangular knife, the incision lying wholly within the transparent cornea, was the one most in use. Von Graefe (A. f. O. 1854) has according to Gibson, of Manchester, the credit of being the first to use the linear method as the most common one in removing soft cataracts. The linear incision lying outside of the clear cornea was then regarded by von Graefe as unsuited to cases where the nucleus was hard and of considerable size, since the wound did not gape sufficiently to permit its ready escape, and in addition to the bruising of the edges of the wound and the iris, the soft matter scraped off and left behind was apt to lodge beneath the iris and produce irritation. This was in a measure obviated by the modification of von Graefe (A. f. O. 1859), by which a section of iris tissue was removed, and since that time the operation involving the linear incision and the iridectomy has borne the name of von Graefe's modified linear operation. In the hands of many operators there has been, however, an undue number of cases involving loss of vitreous humor during the operation or iritic inflammation after it, and gradually they have been returning towards the incision formerly practiced, until at the present day a large proportion take the middle course and by placing the incision partly in the sclerotic and partly in the cornea endeavor to escape the dangers and secure the advantages of both the old flap operation and the new linear method. In this connection a paper (*Klin. Monatsbl. May*) by de Wecker extracted from his forthcoming *Chirurgie Oculaire* is of interest since he claims that nothing is left in the practice of the best ophthalmologists of von Graefe's operation except the delicate narrow bladed knife which he devised and which is now in almost universal use. The unique part of the paper is a private letter from von Graefe to de Wecker written shortly before the death of the great surgeon, in which he stoutly defends his modified operation, against the objections which were springing up. He says that in his hands loss of vitreous was quite infrequent, perhaps once in 80 or 100 cases, and adds: "I believe that the linear character of the present method is the principal advantage of it, and that the incision which I practise is by no means to be placed in the same category with the curved incisions for flap operations. * * * The idea of

making the wound as linear as possible and yet sufficiently large to permit the extension of the lens induced me to place it peripherically because in the scleral border only could the geometrical conditions be fulfilled. * * * * Iridectomy was a condition *sine qua non*, partly to avoid bruising of the iris, but more because the healing was less complicated with prolapse of the iris which was favored by a peripheric incision." De Wecker protest against classifying as Graefe's operation cases of combined procedures and with flaps of different heights, and says that von Graefe himself seems to have realized that his operation was not destined to remain unmodified, but he did not think that the change would be the position of the incision, any alteration of which to a curved one would be "a step backwards into the old vicious ways." It is a curious commentary upon human foresight that this should be the very point subjected to extensive modification.

De Wecker himself has been, for the past two years, making flaps of 2, 3 or 4 mm. high, with iridectomy in the 2 mm. cases, and sometimes with the 3 mm. ; the iris segments removed being much smaller than those of von Graefe. His statistics are certainly remarkable showing 92 per cent. of successes, 5 per cent. partial success, and 3 per cent. failures.

[S. B. ST. J.]

ORIGINAL OBSERVATIONS.

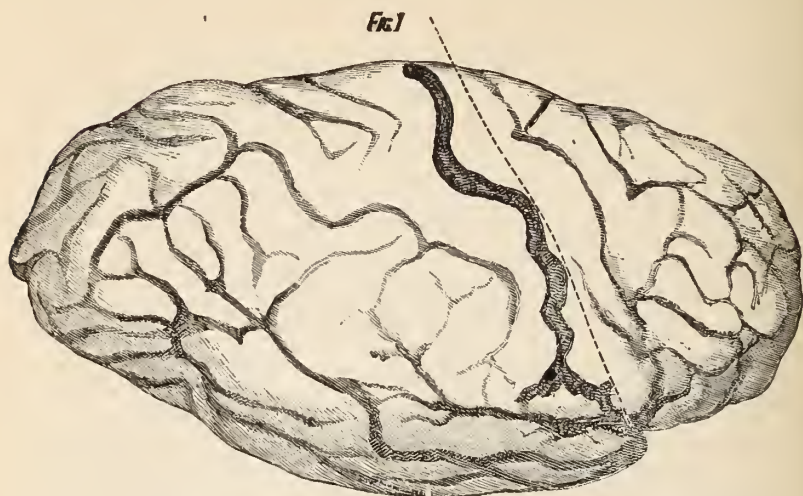
A CONTRIBUTION TO CEREBRAL LOCALIZATION. CASE
REPORTED AT THE MEETING OF THE AMERICAN
NEUROLOGICAL ASSOCIATION, JUNE, 1879.

BY F. T. MILES, M. D., OF BALTIMORE, MD.

The subject of the present report was Mr.—, of Baltimore, over 60 years old, who had suffered for some time with disease of the kidneys, seriously impairing his health. On the night of April 25, 1879, he awoke, after having been asleep for some time, with a paralysis of the left arm and leg. I saw him immediately afterwards, and found him perfectly conscious and intelligent, without the slightest paralysis of the face or tongue, and speaking without the least hesitation or impediment in his articulation. He complained of no pain or abnormal sensations in the paralyzed limbs, which, as far as I could ascertain, possessed their sensibility unimpaired. The next day he insisted on being placed in a chair, but found it extremely difficult to sit erect, his body sinking down towards the paralyzed side. Upon his bed he could not change his position without assistance, the muscles of the trunk seeming on the left side to be involved in the paralysis. During the first day or two after the attack he on several occasions passed his urine involuntarily in bed.

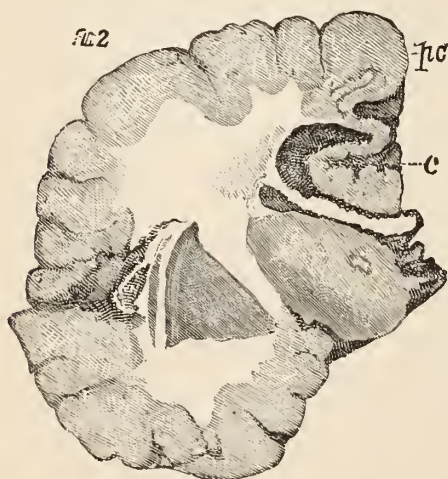
The arm began almost immediately to recover, and in a few days all voluntary movements could be executed by it, but with diminished force and rapidity. The trapezius and muscles of the trunk also recovered rapidly. The lower limb from the hip downwards remained absolutely paralyzed until May 12, seventeen days after the attack, when it was observed that the patient could make a very slight movement of flexion with the great toe. A very gradual recovery took place in the limb, until the time of his

death which occurred June 22d from the progress of the kidney disease. There was no spasm or trembling of the muscles at any time.



The post-mortem showed the pia mater over the hemispheres opaque and œdematous.

The brain was hardened in alcohol, and transverse sections of it made throughout its whole extent.



The section represented in the wood-cut passes through the ascending frontal convolution of the right hemisphere, the "coupe frontale" of Pitres. A blood-clot was found in the position represented in Fig. 2, which is a faithful copy from the specimen. The clot *C* extended about an inch antero-posteriorly, and was situated in the "faisceaux fronto-

pariétaux" of Pitres, lying vertically below the paracentral lobule *P C*, and closely adjacent to the gray matter of the gyrus fornicatus and calloso-marginal fissure.

The case appears of interest to me on account of the few recorded cases of clot, or lesion of this particular region, and because the patient was under observation from the occurrence of the hemorrhage until his death. The definite and absolute paralysis of the leg was very marked, in contradistinction to the arm which was not absolutely paralyzed even at first, and which recovered very quickly, improvement beginning in it from the first day.

It is a question how far the fibres of the white matter had been destroyed or simply pushed aside, and compressed by the clot, and how far the symptoms were caused by the destruction of tracts of transmission, or only by their compression, leaving them capable of functioning upon partial absorption of the extravasation.

CASE OF HEMIPLEGIA WITH FIRST SYMPTOMS IN FOOT, AND
A LIMITED CORTICAL LESION.

By E. C. SEGUIN, M. D.

I venture to add this imperfect case to the admirable one reported by my friend Dr. Miles, because, with certain allowances, it may serve in the discussion about the effects of cortical lesions.

In November, 1878, I saw, in consultation with Dr. Granniss of Saybrook, Ct., a gentleman aged 54 years, who was hemiplegic on the left side, and almost unconscious. The following account of his illness was furnished :

In December, 1877, after having enjoyed good health, he awoke one night with clonic convulsions of the left toes, foot and leg only. There was no impairment of consciousness, no spasm in any other part. He watched the spasm some time, and made comments on it. Since, there has gradually developed a left-sided hemiplegia. For months only the foot and leg were parietic ; in the last few weeks the left arm has become weak, and now the left cheek is parietic, though the relatives have not noticed it. In January, 1878, vision became impaired, but an examination by Dr. Noyes revealed no cause. In the last few weeks patient has seen double at times, and sight has gradually failed. Severe headache has existed from the first ; frontal, bilateral pain, most marked on the right side. This pain has been worst about daylight. In the past month pain decidedly nocturnal. On a number of occasions "lost himself" while out of doors, not remembering where he had

been (*petit-mal*?). A business associate thinks that patient has committed errors in judgment. No extravagance in design or in deed. Lately has become stupid and semi-comatose.

Since January, 1878, a tumor-like swelling has appeared over the right parietal region. No albuminuria, but has had several attacks of gout. After severe cross-examination, patient admits having had a chancre fifteen years ago, treated with mercury; denies secondary and tertiary symptoms.

Examination showed a typical left hemiplegia, face and limbs. No diplopia, pupils small and equal; after atropia there is found a well-marked double neuro-retinitis. Sensibility preserved on the paralyzed side. Articulation indistinct, no aphasia. Stupor is peculiar, like that of drunken sleep. Patient can be roused by loud talking and shaking, and then answers correctly (showing fair memory) and clearly. The swelling upon the head, raised perhaps half an inch, is just above the right parietal eminence, extending inward to the median line, and forward almost to the vertical line from the meatus auditorius to the bregma. This tumor overlies Ferrier's centres for the legs.

Diagnosis: External and internal nodes involving dura mater and the subjacent gyri of the right hemisphere.



A few days later the patient died comatose, and after much trouble Dr. Granniss secured a partial autopsy. He was not allowed to raise the brain from the skull or to incise it. He simply removed the calvarium and noted the lesions at the vertex. He found that there was an internal as well as an external osteitis, forming quite a tumor which had, after adhering to the dura, exerted great pressure upon the subjacent convolutions. Dr. Granniss marked the location of the cortical lesion upon an Ecker's

diagram, and the annexed wood-cut is a copy of his sketch.

It is of course very much to be regretted that a thorough examination of the brain was not permitted, but in view of numerous recent cases, it is impossible not to admit a causal relation between the lesion causing pressure upon the inner end of the right ascending frontal and parietal convolutions and the symptoms in the left foot and leg—spasm and paralysis.

CASE OF CYSTIC TUMOR AT THE BASE OF THE BRAIN.*

By E. C. SPITZKA, M. D.

Last March I was requested by Dr. Seneca Powell, of this city, to examine the brain of a young man who had been under the care of several of our most eminent neurologists, and in regard to whose case considerable differences of opinion had arisen as to the probable location of the tumor suspected to exist.

Dr. E. C. Seguin has kindly placed at my disposal his notes of the case, taken October 25, 1873, five years before the death of the patient. Dr. Seguin first saw the case with Dr. Knapp, June, 1873, and relates as follows :

“Since last June impairment of sight has progressed to almost total blindness ; the patient thinks his sight was worse six months ago, when he could perceive light.

“The general health has improved considerably under tonics and exercise.

“The subjective symptoms have lately consisted in slight frontal headache, prickings (sharp twinges of pain) about the forehead extending to the coronal suture, no head or body numbness, no body neuralgia, nor vertigo. Every night he notices sudden starts of his limbs during early sleep, has suffered much from *pruritus ani*, no straining at stool or piles, and no vesical trouble ; walks two or three miles without fatigue. During the last week has at times seen a vivid play of colors before his eyes.

“Pupils considerably dilated and fixed ; some divergence of eyes and nystagmus. Optic disk bluish-white, right lower part of face rather inactive, left corner of mouth tends outwards, lips remarkably void of expression, and very slightly used in speech, which is thick and slow. The relatives doubt whether this is an increase of a natural hesitancy or of incorrect articulation ; to me

* Read before the American Neurological Association June 19, 1879.

it seems worse ; the sensibility of the face is perfect, hearing normal, no tinnitus, and memory is said to be perfect.

"No marked alteration in motion or sensibility of upper extremity, except that the right hand is only of equal strength with the left, and as he is a right handed man, this, taken in connection with the weakness of the right side of face, constitutes a slight right hemiplegia. He walks and stands well, has no nausea and vomiting, and no unnatural depression.

"I adhere to my former opinion, that a lesion in the neighborhood of the corpora quadrigemina is producing nerve atrophy and hemiplegia ; whether the lesion is a tumor or a sclerosis I am unable to say. No treatment."

At the autopsy table I obtained from Drs. Knapp, Hammond and Powell particulars of his subsequent history to the following effect :

Total blindness had been produced several years before death, there was complete nerve atrophy, severe headache, occasional paraplegia which was also one of the terminal phenomena, occasional paresis of one or the other arm, most marked in the right, but disappearing before death, persistence of nystagmus, vomiting, stupor and somnolence, and for the two years before death the patient was, according to Dr. Knapp, decidedly insane, having hallucinatory and delusional deliria. His delusions chiefly referred to financial transactions in which the Deity took some part, he saw the heavenly gates open and bright images before him.* The patient was impotent and had atrophic testicles.

There were present at the autopsy, Drs. Powell, Hammond, Hirsch, Knapp, Weber and several others. Before the brain was exposed the several opinions that had been held during the patient's life-time were passed in review, there were four different localities in which a tumor had been located, and in not one of these was it found.

The dura mater showed nothing abnormal on the convexity, the pia arterioles were injected, and the cerebral veins tortuous. As I was preparing to separate the orbital face of the frontal lobes from the cranial base, my fingers encountered a tense resistant mass, which, after careful digital exploration, I was forced to cut and scrape away from the bone, and after this tedious process,

* During the discussion that followed the reading of the paper, Dr. Seguin reminded me of one symptom that I subsequently recollected having heard Dr. Hirsch mention on the occasion of the autopsy. The patient saw myriads of worms swimming about, especially in dishes and vessels used at table.

succeeded in removing the brain with this body uninjured and in situ. The latter was firmly attached to the pia at the base of the brain, but could be removed from it by careful dissection, whereas, the dura mater was entirely involved in the neoplasm, and nothing but the naked bone left at that part of the cranial base to which it had been adherent. The sac, for such it was, might best be compared to a small orange, flattened in the vertical diameter, this measured about four centimetres, the transverse diameter was five and a-half centimetres and the antero-posterior seven. On cutting into it, a large quantity of dark venous blood escaped most of which was coagulated, and the walls of the sac were found to be composed of a concentrically laminated tough fibrous tissue, measuring from three to eight millimetres in thickness. On its inner aspect trabeculæ of a reddish brown color and moderately firm consistency were noticed, as well as deposits of tissue on the inner face of the sac in layers strongly resembling both macro and microscopically the most recent layers of a hæmatoma.

The growth of the tumor had encroached on the cranial walls, the projection of the clivus was destroyed, the fossa pituitaria almost obliterated, the clinoid process and olivary eminence had entirely disappeared, and the carotid canals were opened on their inner aspect. There thus resulted an oval excavation of the base of the cranium which had encroached so far on the anterior part of the sphenoid bone as to cause a double hiatus, one on each side, covered by the mucous membrane of the sphenoidal sinus. The left foramen opticum was opened above and the ridge of the lesser sphenoidal wing eroded.

The left optic nerve was entirely cut in two by the tumor, the divided extremities were both conical, and distant from each other about five millimetres, not even the sheath was continuous.

On the right side the nerve was almost in the same condition, being thinned down to the diameter of two millimetres at the optic foramen, the place of separation of the left nerve was more posterior than this, being within the cranial cavity by half a centimetre.

The chiasm and optic tracts were very difficult of identification, being flattened out to the thickness of a sheet of drawing paper, and almost inseparably adherent to the superior face of the sac.

There was not a trace of the cavernous sinus to be found, but the sixth nerve was curiously enough intact, being located a little laterally to its natural position, and in a bony groove of its own excavation, at the point where the tumor was thickest.

The other nerves, making their exit through the *foramen orbitale*, were apparently intact, with the exception of the left trochlearis and oculo-motor, the former being extensively, the latter slightly softened. All these nerves were crowded to the side of the tumor.

Most remarkable was the course of the internal carotid arteries and the circle of Willis. The former ran round on the lateral aspect of the tumor, so that the origins of the middle cerebral arteries were distant five centimetres from each other. Not a single part of the circle was obliterated, and the anterior communicating artery was actually two and a half centimetres long.

The infundibulum of the pituitary body had been entirely cut in two, so that above the tumor had exposed the third ventricle; below it touched the remnant of the hypophysis, which was, as it were, cleanly cut at the level of the cranial excavation, and was in no connection with the tumor whatever. Its tissue was still firm, and of the normal reddish color.

The tumor touched behind the anterior ventricose part of the pons, the central tubular gray matter of the third ventricle, the basilar part of the crura cerebri, as well as the olfactory and lower inner part of the innermost frontal convolution and the peduncle of the corpus collosum, were softened to fluidification, while the ventricle of the pellucid septum was opened.

The thalami, the greater part of the crura, the pons, with the exception of the anterior ventricose part, the medulla oblongata and cerebellum were entirely healthy. Nothing abnormal could be detected in the corpora quadrigemina, except that if anything the anterior pair were slightly smaller than usual. The ventricular serum was turbid and the ependyma cloudy.

There were two small cysts in the cuneus of the occipital lobe, excavated in the sub-cortical white substance. One of these was clearly of a perivascular origin; the other probably also.

The growth must have begun on the anterior border of the chiasm, and grown more rapidly backwards than forwards during the last few years of the patient's life; while in the early part of his history the effects were concentrated on the optic nerves. Later on they involved the oculo-motor, the crura first on one side (hemiparesis), then of both (paraplegia with hemiparesis), and by transmitted pressure on the pons, the facial nerve may have been transitorily affected.

It is to be regretted that this patient was not examined prior to the period when optic nerve atrophy became established, as it is

to be presumed that hemiopia of an unusual form was present. In reply to a suggestion made during the discussion of the case, that the tumor might have been aneurismal in character, I have to say that I exclude such a possibility entirely. All the arteries at the base were perfectly healthy, and in no connection with the sac.

TRIGEMINAL NEURALGIA OF LONG STANDING CURED BY
THE ADMINISTRATION OF LARGE DOSES OF ACONITIA.

By ROBT. F. WEIR, M. D.,

SURGEON TO THE NEW YORK AND ROOSEVELT HOSPITALS.

Peter Derken, æt. 38, a German, was first seen April 15, 1879, in consultation with Dr. W. T. Alexander. The patient had had severe neuralgia for eighteen years, affecting principally the distribution of the infra-orbital nerve of the left side of the face, with the paroxysm recurring nearly every minute. Sleep has been obtained by use of chloral and opium.

Eighteen months since the nerve was divided at its point of emergence on the cheek, and half an inch of it removed by Dr. A. B. Mott, of this city. As a result of this operation the pain was absent for three or four months, when it recurred, and it is now more marked in the parotid and temporal regions and along the teeth of the upper jaw. The neuralgia has lately affected the teeth of the lower jaw also on the same side.

Aconitia was advised as worthy of a trial prior to resorting to the removal of the remaining deeper portion of the nerve, and Duquesnel's preparation gr. $\frac{1}{40}$ (obtained at Neergaard's), was exhibited three times a day, which, on the 17th inst., was increased to gr. $\frac{1}{8}$ *ter die*. After the second dose of this strength the patient felt slight coldness over the body, with moderate tingling sensations. No effect on the neuralgia was, however, noticed, and on the 19th four doses of gr. $\frac{1}{8}$ each were given without any physiological effect, though the pain was made easier, so much so that the patient slept the next night without any anodyne.

April 25th.—Has now increased the doses of aconitia to seven per diem, each being gr. $\frac{1}{8}$.

No physiological effects have been produced by the remedy, except occasionally a slight chilliness.

The amelioration of the pain is most marked. He feels it only moderately in the lower molars in the afternoon, though he had

never before noticed any intensification of pain at such times of the day.

Since this last date the patient passed from under observation, but the following note from Dr. Alexander completes the case :

NEW YORK, *June 4, '79.*

DOCTOR WEIR.

DEAR SIR :

Mr. Derkin told me this morning that he has had no return of his neuralgia since he last saw you, with the exception of one or two slight transitory twinges during the last two days, which he attributes to the bad weather. He has taken none of the medicine since he was at your office, and feels perfectly well in every respect.

I made pressure on various parts of his face, but caused no pain by so doing.

Yours truly,

W. T. ALEXANDER.

ARCHIVES OF MEDICINE.

Original Articles.

SOME MEASUREMENTS OF THE HEADS OF MALES AND FEMALES, SHOWING THAT THE BRAIN OF THE MALE HAS A COMPARATIVELY GREATER VOLUME IN THE ANTERIOR PART OF THE CRANIAL CAVITY, THAT THE BRAIN OF THE FEMALE HAS A COMPARATIVELY GREATER VOLUME IN THE SUPERIOR PART OF THE CRANIAL CAVITY, AND THAT EDUCATION IN THE MALE AND THE FEMALE TEND TO INCREASE THE VOLUME OF THE BRAIN IN THE ANTERIOR PART OF THE CRANIAL CAVITY.

By J. S. WIGHT, M. D.

PROFESSOR OF THE PRINCIPLES AND PRACTICE OF SURGERY IN THE LONG ISLAND COLLEGE HOSPITAL, BROOKLYN, N. Y.

IN the early part of the year 1878, I published some measurements of Skulls and Heads, and some conclusions drawn from the measurements. A few of the skulls measured were probably from females. All the heads measured were those of males. The heads of uneducated men were compared with the heads of educated men. The general conclusions reached were: (1) That the anterior parts of the cerebrum increased in size as the entire brain continued its growth; (2) that the anterior parts of the cerebrum increased in size as the brain was educated; and (3) that an important indication of the development of the

brain was found in the size of the masto-frontal angle.

I now venture to put forth a few more points on this interesting subject. And I have measured the heads of 21 uneducated women; have noted the measurements in tabular form; and have carefully compared them with the measurements of the heads of 21 uneducated men—taken from my previous tables. It may be noted that the 21 uneducated women, whose heads were measured, mostly belonged to a class which had received little or no education from the earliest times. In this way the question of *heredity* will be opened to some extent.

In order to refresh the memory in regard to the measurements of the head, let me cite some descriptions from my previous paper on craniology, namely:

In measuring *skulls* and *heads*, I have made use of the following method—namely: Each mastoid process is made a centre of departure; and the point assumed is at the middle of the surface of the mastoid process, just back of the external meatus auditorius, ordinarily from half an inch to an inch above the mastoid extremity. This point is located nearly in a line with the base of the cerebrum; but it falls somewhat below the insertion of the tentorium; so that some of the cerebellum may rise above this *centre point*, and some of the middle cerebral lobe may fall below a line going from it to the supra-orbital ridge. This point is a mark that can be found at all times.

The measurements of skulls and heads are made in the following directions from one mastoid centre-point to the other:

(1) An *anterior arch* just above the supra-orbital ridge.

(2) A *frontal arch* over the frontal eminences.

(3) A *middle arch* nearly over the coronal suture. In better-developed skulls and heads, the coronal suture is further forward; in less-developed skulls and heads, the coronal suture is further backwards.

(4) A *superior arch*, nearly over the vertex, and about parallel with the axis of the foramen magnum.

(5) A *posterior arch* over the occipital protuberance, nearly on a line with the insertion of the tentorium. *These are the inter-mastoid arches.*

Also determine—

(6) A diametrical *base-line* from one mastoid point to the other.

(7) The *greatest transverse diameter*.

(8) The *greatest antero-posterior diameter*—leaving out the frontal sinuses.

The following table contains the dimensions of the Heads of 21 uneducated women :

TABLE No. I.

Containing the dimensions of the heads of the 21 uneducated women ; also the age, nativity, and occupation.

| No. | Age. | Nativity. | Occupation. | Inches—Height. | Circumference. | Antero-post Diameter. | Base Line. | Transverse Diameter. | Anterior Arch. | Frontal Arch. | Middle Arch. | Superior Arch. | Posterior Arch. | Ma-to-frontal Angle. |
|-----|------|-----------|-------------|------------------------------|------------------------------|------------------------------|------------|----------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|----------------------|
| 1 | 43 | Ire. | M. | 63 | 22 ² ₈ | 7 ¹ ₁₁ | 5 | 5 | 14 | 15 | 15 | 15 | 9 ¹ ₈ | 65° |
| 2 | 25 | U. S. | M. | 60 | 20 ⁵ ₈ | 7 ¹ ₁₁ | 5 | 5 | 12 ¹ ₄ | 13 ¹ ₈ | 14 ¹ ₈ | 13 ¹ ₈ | 8 ¹ ₈ | 75° |
| 3 | 35 | Ire. | W. | 62 | 22 ² ₈ | 7 ¹ ₁₁ | 5 | 6 | 13 | 14 | 14 | 14 | 8 | 65° |
| 4 | 32 | Ire. | M. | 67 | 22 | 7 ¹ ₁₁ | 5 | 5 | 13 ¹ ₈ | 14 | 14 | 14 | 7 ¹ ₁₁ | 65° |
| 5 | 40 | Ire. | M. | 61 | 22 ¹ ₈ | 7 ¹ ₁₁ | 5 | 5 | 13 | 14 | 14 | 14 | 8 | 70° |
| 6 | 22 | Ire. | M. | 61 ⁴ ₈ | 22 | 7 ¹ ₁₁ | 5 | 6 | 13 | 14 | 15 | 15 | 8 | 70° |
| 7 | 34 | Ire. | M. | 67 | 22 ⁴ ₈ | 7 ¹ ₁₁ | 5 | 5 | 13 | 14 | 14 | 15 | 7 ¹ ₁₁ | 68° |
| 8 | 31 | U. S. | M. | 62 | 22 ⁴ ₈ | 7 ¹ ₁₁ | 5 | 5 | 12 ¹ ₄ | 13 | 14 | 14 | 7 ¹ ₁₁ | 65° |
| 9 | 23 | U. S. | M. | 61 | 21 ¹ ₈ | 7 ¹ ₁₁ | 5 | 5 | 12 ¹ ₄ | 13 | 14 | 14 | 7 ¹ ₁₁ | 74° |
| 10 | 38 | Ire. | M. | 61 | 22 | 7 ¹ ₁₁ | 5 | 5 | 12 | 14 | 14 | 14 | 8 | 68° |
| 11 | 70 | Ire. | M. | 60 | 21 ¹ ₈ | 7 ¹ ₁₁ | 5 | 5 | 12 | 13 | 13 | 13 | 8 | 73° |
| 12 | 70 | Ire. | M. | 63 | 22 | 7 ¹ ₁₁ | 5 | 6 | 12 ¹ ₄ | 13 | 14 | 14 | 7 ¹ ₁₁ | 62° |
| 13 | 24 | Ire. | W. | 62 ⁴ ₈ | 21 ¹ ₈ | 7 ¹ ₁₁ | 5 | 5 | 12 | 13 | 14 | 14 | 7 ¹ ₁₁ | 75° |
| 14 | 36 | Ire. | M. | 61 | 20 ¹ ₈ | 7 ¹ ₁₁ | 5 | 5 | 12 | 13 | 14 | 14 | 7 ¹ ₁₁ | 70° |
| 15 | 47 | Ire. | M. | 59 | 21 ¹ ₈ | 7 ¹ ₁₁ | 5 | 5 | 12 | 13 | 14 | 14 | 7 ¹ ₁₁ | 69° |
| 16 | 29 | Eng. | M. | 65 | 22 ¹ ₈ | 7 ¹ ₁₁ | 5 | 6 | 13 | 14 | 14 | 14 | 7 ¹ ₁₁ | 75° |
| 17 | 41 | Ire. | M. | 62 | 22 ¹ ₈ | 7 ¹ ₁₁ | 5 | 5 | 13 | 14 | 14 | 14 | 7 ¹ ₁₁ | 78° |
| 18 | 38 | Ire. | S. | 69 | 22 ¹ ₈ | 7 ¹ ₁₁ | 5 | 6 | 13 ¹ ₈ | 14 | 15 | 15 | 8 | 70° |
| 19 | 48 | U. S. | W. | 63 | 20 | 6 ⁴ ₈ | 4 | 5 | 11 ¹ ₄ | 12 | 13 | 13 | 8 | 75° |
| 20 | 20 | U. S. | S. | 59 | 19 | 6 ⁴ ₈ | 4 | 5 | 11 | 12 | 13 | 13 | 7 ¹ ₁₁ | 70° |
| 21 | 40 | Can. | M. | 59 | 21 ¹ ₈ | 7 ¹ ₁₁ | 5 | 5 | 12 | 13 | 14 | 14 | 7 ¹ ₁₁ | 72° |

(9) The *greatest antero-posterior circumference*—leaving out the frontal sinuses, and measuring somewhat above the occipital protuberance.

(10) The *masto-frontal angle*, which is included between the planes of the anterior and superior arches.



FIG. I.

In the above table, those marked *M* are married and keep house; those marked *W* are widows and do general work; and those marked *S* are single and do sewing. All of them so far as could be ascertained, belonged to the most respectable class of the poor. They were simply engaged in a hand-to-hand struggle for existence. And the majority of them were contributing largely to the increase of the population. This must be taken into the account of their brain-development. The age of the youngest was 20 years. The age of the oldest was 70 years.

The least, the greatest, and the average dimensions of the heads of 21 uneducated women are noted in the following table:

TABLE No. II.

Containing the least, the greatest, and the average dimensions of the heads of
21 uneducated women.

| DIMENSIONS. | LEAST. | GREATEST. | AVERAGE. |
|------------------------|----------------|-------------------------|----------------|
| Base-line, | 4.5 inches. | 5.375 inches. 4.5 " | 5.047 inches. |
| Difference, | | .875 inches. | |
| Transverse Diameter, | 5.25 inches. | 6. inches. 5.25 " | 5.755 inches. |
| Difference, | | .75 inches. | |
| Antero-post. Diameter, | 6.5 inches. | 7.75 inches. 6.5 " | 7.375 inches. |
| Difference, | | 1.25 inches. | |
| Circumference, | 19. inches. | 22.25 inches. 19. " | 21.613 inches. |
| Difference, | | 3.25 inches. | |
| Anterior Arch, | 11.125 inches. | 14. inches. 11.125 " | 12.565 inches. |
| Difference, | | 2.875 inches. | |
| Frontal Arch, | 12.5 inches. | 15. inches. 12.5 " | 13.803 inches. |
| Difference, | | 2.5 inches. | |
| Middle Arch, | 13. inches. | 15. inches. 13. " | 14.344 inches. |
| Difference, | | 2. inches. | |
| Superior Arch, | 13. inches. | 15.5 inches. 13. " | 14.434 inches. |
| Difference, | | 2.5 inches. | |
| Posterior Arch, | 7.25 inches. | 9.125 inches. 7.25 " | 7.994 inches. |
| Difference, | | 1.875 inches. | |
| Masto-frontal Angle, | 62°. | 78°. 62°. | 70.2°. |
| Difference, | | 16°. | |

From the above table may be drawn the following conclusions in regard to the heads of 21 uneducated women :

- (1.) The average base-line is 5.047 inches.
- (2.) The average transverse diameter is 5.755 inches.
- (3.) The average antero-posterior diameter is 7.375 inches.
- (4.) The average circumference is 21.613 inches.
- (5.) The average anterior arch is 12.565 inches.

- (6.) The average frontal arch is 13.803 inches.
 (7.) The average middle arch is 14.344 inches.
 (8.) The average superior arch is 14.434 inches.
 (9.) The average posterior arch is 7.994 inches.
 (10.) The average masto-frontal angle is 70.2°.

In this place may be introduced table No. 7 of my previous paper on craniology, namely :

TABLE No. III.

Containing the least, the greatest and the average dimension of the heads of 21 uneducated men.

| Dimensions. | Least. | Greatest. | Average. |
|---------------------------------|---------------|------------------------------|----------------|
| Base-line | 4.75 inches. | 5.875 inches. 4.75 " | 5.386 inches. |
| Difference | | 1.125 inches. | |
| Transverse Diameter | 5.625 inches. | 6.75 inches. 5.625 " | 6.005 inches. |
| Difference | | 1.125 inches. | |
| Antero-post. Diam'r. | 6.875 inches. | 8. inches. 6.875 " | 7.446 inches. |
| Difference | | 1.125 inches. | |
| Circumference . . | 21 inches. | 23. inches. 21. " | 22.029 inches. |
| Difference | | 2. inches. | |
| Anterior Arch . . | 13. inches. | 15. inches. 13. " | 13.886 inches. |
| Difference | | 2. inches. | |
| Frontal Arch . . . | 13.5 inches. | 15.5 inches. 13.5 " | 14.482 inches. |
| Difference | | 2. inches. | |
| Middle Arch . . . | 13.5 inches. | 15. inches. 13.5 " | 14.321 inches. |
| Difference | | 1.5 inches. | |
| Superior Arch . . | 13. inches. | 15.5 inches. 13. " | 13.964 inches. |
| Difference | | 2.5 inches. | |
| Posterior Arch . . | 7.25 inches. | 8.25 inches. 7.25 inches. | 7.833 inches. |
| Difference | | 1. inch. | |
| Masto-frontal Angle. | 67.° | 82.° 67.° | 76.5° |
| Difference | | 15.° | |
| Next least Masto-frontal Angle. | 72.° | 82.° 72.° | |
| Difference | | 10.° | |

From the above table may be drawn the following conclusions in regard to the heads of twenty-one uneducated men:

- (1) The average base-line is 5.386 inches.
- (2) The average transverse diameter is 6.005 inches.
- (3) The average antero-posterior diameter is 7.446 inches.
- (4) The average circumference is 22.029 inches.
- (5) The average anterior arch is 13.886 inches.
- (6) The average frontal arch is 14.482 inches.
- (7) The average middle arch is 14.321 inches.
- (8) The average superior arch is 13.964 inches.
- (9) The average posterior arch is 7.833 inches.
- (10) The average masto-frontal angle is 76.5° .

The following statements may now be made:

1. Similar solids are to each other as the cubes of their similar dimensions.

2. The average head of the uneducated woman is approximately similar to the average head of the uneducated man.

3. The similar dimensions of the heads of the uneducated woman and the uneducated man may be compared—so as to give approximate results.

4. The average weight of the adult female brain is 44 ounces; the average weight of the adult male brain is 50 ounces. This is approximate.

5. The specific gravity of the brain is somewhat constant.

6. Hence the weight of the brain will nearly represent the cubic capacity of the skull, and be approximately proportional to the dimensions of the skull.

7. Hence, the average brain-weights of women and men may be used for comparing the similar dimensions of their heads.

8. This method will give approximate results and correct indications.

Upon the above statements as a basis, let us compute the ratios of the average like dimensions of the heads of 21 uneducated men and 21 uneducated women, and tabulate them as below :

TABLE No. IV.

Containing the ratios of the average dimensions of the heads of 21 uneducated men and 21 uneducated women.

| RATIOS. | DIMENSIONS. | 21 WOMEN. | 21 MEN. |
|--------------|-------------------------|-------------------------|-------------------------|
| (1.) 44 : 50 | Base-Line :: | 5.047 ³ | 5.386 ³ |
| | | 128.559 : | 156.242. |
| (2.) 44 : 50 | Transverse Diameter :: | 5.755 ³ | 6.005 ³ |
| | | 190.605 : | 218.163. |
| (3.) 44 : 50 | Antro-post. Diameter :: | 7.375 ³ | 7.446 ³ |
| | | 391.026 : | 412.806. |
| (4.) 44 : 50 | Circumference :: | 21.613 ³ | 22.029 ³ |
| | | 10095.864 : | 10688.572. |
| (5.) 44 : 50 | Anterior Arch :: | 12.565 ³ | 13.886 ³ |
| | | 1983.636 : | 2677.498. |
| (6.) 44 : 50 | Frontal Arch :: | 13.803 ³ | 14.482 ³ |
| | | 2629.747 : | 3037.275. |
| (7.) 44 : 50 | Middle Arch :: | 14.344 ³ | 14.321 ³ |
| | | 2951.278 : | 2938.525. |
| (8.) 44 : 50 | Superior Arch :: | 14.434 ³ | 13.964 ³ |
| | | 3007.179 : | 2722.840. |
| (9.) 44 : 50 | Posterior Arch :: | 7.964 ³ | 7.833 ³ |
| | | 502.822 : | 460.554. |

In regard to the ratios of the dimensions of the heads of 21 uneducated women and 21 uneducated men, from Table No. IV may be drawn the following conclusions, namely :

1. The ratio of 44:50 is greater than the ratio of 128.559:156.242: Hence the base of the brain of the uneducated

woman has a comparatively less volume on the average than the base of the brain of the uneducated man.

2. The ratio of 44:50 is a very little greater than the ratio of 190.605:218.163: Hence, in the transverse diameter, the volume of the brain is comparatively a very little less for an uneducated woman than for an uneducated man.

3. The ratio of 44:50 is less than the ratio of 391.026:412.806: Hence, the volume of the brain, in the antero-posterior diameter, is comparatively greater for the uneducated woman than for the uneducated man.

4. The ratio of 44:50 is less than the ratio of 10095.864:10688.572: Hence, the average circumference of the head of the uneducated woman indicates a comparatively greater volume of brain than the average circumference of the head of the uneducated man.

5. The ratio of 44:50 is greater than the ratio of 1983.638:2677.498: Hence, the average anterior arch of the head of the uneducated woman indicates a comparatively less volume of brain than the average anterior arch of the head of the uneducated man.

6. The ratio of 44:50 is greater than the ratio of 2629.747:3037.275: Hence, the average frontal arch of the head of the uneducated woman indicates a comparatively less volume of brain than the average frontal arch of the head of the uneducated man.

7. The ratio of 44:50 is less than the ratio of 2951.278:2938.525: Hence, the average middle arch of the head of the uneducated woman indicates a comparatively greater volume of brain than the average middle arch of the head of the uneducated man.

8. The ratio of 44:50 is less than the ratio of 3007.179:2722.840: Hence, the average superior arch of the head of the uneducated woman indicates a comparatively greater

volume of brain than the average middle arch of the head of the uneducated man.

9. The ratio of 44 : 50 is less than the ratio of 502.822 : 460.554 : Hence, the average posterior arch of the head of the uneducated woman indicates a comparatively greater volume of brain than the average posterior arch of the head of the uneducated man. As there was great difficulty, on account of the abundant hair, in measuring the posterior arch on the heads of women, the hair making the measurement, in some instances, somewhat greater than it should be, the ninth conclusion, above stated, will have to be modified, as follows : The average posterior arch of the heads of twenty-one uneducated women indicates comparatively about the same volume of brain as the average posterior arch of the heads of twenty-one uneducated men.

It ought to be noted here, that two Italian physicians, Drs. Colombi and Pizzi, have found some difference between the specific gravities of the brains of women and men : first, for women 1.018 ; second, for men 1.023. This would change the volume-ratio above used from 44 : 50 to 43.221 : 48.875. And this ratio would not materially affect the above conclusions : yet it would modify them somewhat. The modified ground may be covered by the following general statement, namely :

In the regions of the base-line, the transverse diameter, the anterior arch, and the frontal arch, the volume of the uneducated female brain comparatively approaches more nearly to the volume of the uneducated male brain. In the regions of the antero-posterior diameter, the circumference, the middle arch, the superior arch, and the posterior arch, the volume of the uneducated female brain comparatively exceeds the volume of the uneducated male brain more fully than it was shown by the ratio 44 : 50.

And in any case, in the regions of the middle arch, the

superior arch, and the posterior arch, comparatively the volume of the average uneducated female brain is actually greater than the volume of the uneducated male brain. And this shows two things, namely, (1) In the uneducated female head, a preponderance of brain posteriorly; and (2) in the uneducated male head a preponderance of brain anteriorly. Of course the adult brain is under consideration.

My previous paper closed with the following statement:

"In fine, the inter-mastoid arches and the masto-frontal angle are, as it were, the expression of distinguishing traits in individuals and in races; and their size is more or less affected by development, growth and education; *but the masto-frontal angle is in general the most significant mark.*"

We have already seen that the inter-mastoid arches and the diameters of the head are somewhat distinguishing marks of the two classes of the uneducated under consideration: they are marks of development and growth. As to which class has the best development is a point to be inquired into further on. In the meantime, before considering the relations of the masto-frontal angle, let us go over some points of variation in the dimensions of the heads of 21 uneducated women and 21 uneducated men.

TABLE No. V.

Containing the variations in the dimensions of the heads of 21 uneducated women and 21 uneducated men.

VARIATIONS.

| DIMENSIONS. | 21 UNEDUCATED WOMEN. | 21 UNEDUCATED MEN. | DIFFERENCE. |
|------------------------|-------------------------|-----------------------|-----------------|
| Base-line, | .875 inches. | 1.125 inches. | M. .25 inches. |
| Transverse Diameter, | .75 inches. | 1.125 inches. | M. .375 inches. |
| Antero-post. Diameter, | 1.25 inches. | 1.125 inches. | W. .125 inches. |
| Circumference, | 3.25 inches. | 2. inches. | W. .125 inches. |
| Anterior Arch, | 2.875 inches. | 2. inches. | W. .875 inches. |
| Frontal Arch, | 2.5 inches. | 2. inches. | W. .5 inches. |
| Middle Arch, | 2. inches. | 1.5 inches. | W. .5 inches. |
| Superior Arch, | 2.5 inches. | 2.5 inches. | .00 inches. |
| Posterior Arch, | 1.875 inches. | 1. inches. | W. .875 inches. |
| Masto-frontal Angle, | 16°. | 15°. | W. 1°. |

From the above table may be drawn the following conclusions, namely :

1. The base-line of the heads of 21 uneducated men varies more than the base-line of the heads of 21 uneducated women, by one-fourth of an inch.

2. The transverse diameter of the heads of 21 uneducated men varies more than the transverse diameter of the heads of 21 uneducated women, by three-eighths of an inch.

3. The antero-posterior diameter of the heads of 21 uneducated women varies more than the antero-posterior diameter of the heads of 21 uneducated men by one-eighth of an inch.

4. The circumference of the heads of uneducated women varies more than the circumference of the heads of 21 uneducated men, by one and one-fourth inches.

5. The anterior arch of the heads of 21 uneducated women varies more than the anterior arch of the heads of 21 uneducated men, by seven-eighths of an inch.

6. The frontal and middle arches of the heads of 21 uneducated women vary more than the frontal and middle arches of the heads of 21 uneducated men, by one-half inch for each of the arches.

7. The superior arch of the heads of 21 uneducated women and the superior arch of the heads of 21 uneducated men have the same variation.

8. The posterior arch of the heads of 21 uneducated women varies more than the posterior arch of the heads of 21 uneducated men, by seven-eighths of an inch.

9. The masto-frontal angle of the heads of 21 uneducated women varies more than the masto-frontal angle of the heads of 21 uneducated men, by one degree.

It will be convenient for comparison and reference to put the figures of the masto-frontal angles above tabulated side by side in the following table :

TABLE No. VI.

Containing the masto-frontal angles of the heads of 21 uneducated women and
21 uneducated men.

MASTO-FRONTAL ANGLE.

| No. | UNEDUCATED WOMEN. | UNEDUCATED MEN. |
|-------------|-------------------|-----------------|
| 1 | 65° | 77° |
| 2 | 75° | 73° |
| 3 | 65° | 77° |
| 4 | 65° | 75° |
| 5 | 70° | 80° |
| 6 | 70° | 76° |
| 7 | 68° | 76° |
| 8 | 65° | 80° |
| 9 | 74° | 81° |
| 10 | 68° | 74° |
| 11 | 73° | 74° |
| 12 | 62° | 75° |
| 13 | 75° | 67° |
| 14 | 70° | 72° |
| 15 | 69° | 80° |
| 16 | 75° | 76° |
| 17 | 78° | 80° |
| 18 | 70° | 79° |
| 19 | 70° | 76° |
| 20 | 75° | 70° |
| 21 | 72° | 82° |
| Least. | 62° | 67° |
| Greatest. | 78° | 82° |
| Average. | 70.2° | 76.5° |
| Difference. | 16° | 15° |

From the above table may be drawn the following conclusions, namely:

1. The least masto-frontal angle of the heads of 21 uneducated women is 62°.

2. The greatest masto-frontal angle of the heads of 21 uneducated women is 78°.

3. The least masto-frontal angle of the heads of 21 uneducated men is 67°.

4. The greatest masto-frontal angle of the heads of 21 uneducated men is 82°.

5. The least masto-frontal angle of the heads of 21 uneducated men is greater than the least masto-frontal angle of the heads of 21 uneducated women, by 5°.

6. The greatest masto-frontal angle of the heads of 21

uneducated men is greater than the greatest masto-frontal angle of the heads of 21 uneducated women, by 4° .

7. The average masto-frontal angle of the heads of 21 uneducated women is 70.2° .

8. The average masto-frontal angle of the heads of 21 uneducated men is 76.5° .

9. The average masto-frontal angle of the heads of 21 uneducated men is greater than the average masto-frontal angle of the heads of 21 uneducated women, by 6.3° .

10. Of the 21 heads of uneducated women, there are five cases in which the masto-frontal angle is less than the least masto-frontal angle of the 21 heads of uneducated men.

11. Of the 21 heads of uneducated men, there are seven cases in which the masto-frontal angle is greater than the greatest masto-frontal angle of the 21 heads of uneducated women.

The difference between the next least and the greatest masto-frontal angles of the heads of 21 uneducated men is 10° . This difference was mistakenly put at 9° in my previous paper.

It may be here remarked, that the inter-mastoid arches show a comparative preponderance of brain in the anterior part of the cranial cavity of the uneducated man, and a comparative preponderance of brain in the posterior part of the cranial cavity of the uneducated woman. But we must now add the evidence furnished by the masto-frontal angle. Since the masto-frontal angle of the uneducated man is greater on the average than the masto-frontal angle of the uneducated women; and since the greater masto-frontal angle, other things being equal, shows a greater volume of brain in the anterior part of the cranial cavity; it would follow, *that the uneducated man has more brain in the anterior part of the cranial cavity than the uneducated woman.*

Now it has previously been shown, that the head of the

educated man has more brain in the anterior part of the cranial cavity than the head of the uneducated man: Hence, it follows, that the head of the educated man has more brain in the anterior part of the cranial cavity than the head of the uneducated woman. This conclusion can be reached by a comparison of the dimensions of the heads of educated men and uneducated women.

And I have also measured the heads of 21 educated women: In order to determine approximately any differences between the heads of educated women and the heads of uneducated women,—also any differences between the heads of educated women and the heads of educated men. The following table contains the dimensions of the heads of 21 educated women.

TABLE No. VII.

| No. | Nationality. | Occupation. | Height. | Circumference. | Antero-post Diameter. | Base Line. | Transverse Diameter. | Anterior Arch. | Frontal Arch. | Middle Arch. | Superior Arch. | Posterior Arch. | Masto-frontal Angle. |
|-----|--------------|-------------|---------|----------------|-----------------------|------------|----------------------|----------------|---------------|--------------|----------------|-----------------|----------------------|
| 1 | U. S. | M. | 64 | 22 | 7 | 5 | 5 | 12 | 13 | 14 | 14 | 8 | 75° |
| 2 | U. S. | S. | 62 | 22 | 7 | 5 | 5 | 13 | 14 | 14 | 14 | 8 | 72° |
| 3 | Germ. | M. | 64 | 21 | 7 | 4 | 5 | 12 | 13 | 14 | 14 | 7 | 71° |
| 4 | Eng. | W. | 64 | 21 | 7 | 5 | 5 | 13 | 14 | 14 | 14 | 8 | 71° |
| 5 | Eng. | M. | 62 | 21 | 7 | 5 | 5 | 12 | 13 | 13 | 14 | 7 | 70° |
| 6 | Eng. | S. | 65 | 22 | 7 | 5 | 5 | 13 | 14 | 14 | 14 | 8 | 74° |
| 7 | Eng. | M. | 63 | 21 | 7 | 5 | 5 | 12 | 13 | 14 | 14 | 7 | 72° |
| 8 | Eng. | M. | 62 | 21 | 7 | 5 | 5 | 12 | 13 | 14 | 14 | 7 | 73° |
| 9 | Eng. | S. | 58 | 20 | 6 | 5 | 5 | 12 | 13 | 13 | 13 | 7 | 72° |
| 10 | U. S. | W. | 67 | 22 | 7 | 5 | 5 | 12 | 13 | 14 | 14 | 8 | 78° |
| 11 | Eng. | S. | 63 | 22 | 7 | 5 | 5 | 13 | 14 | 14 | 14 | 7 | 73° |
| 12 | U. S. | S. | 63 | 22 | 7 | 5 | 6 | 12 | 14 | 14 | 14 | 7 | 75° |
| 13 | U. S. | S. | 63 | 21 | 7 | 5 | 5 | 13 | 14 | 14 | 14 | 7 | 75° |
| 14 | U. S. | M. | 60 | 21 | 7 | 4 | 5 | 12 | 14 | 14 | 14 | 7 | 75° |
| 15 | U. S. | M. | 63 | 22 | 7 | 5 | 5 | 12 | 13 | 15 | 15 | 8 | 71° |
| 16 | U. S. | W. | 60 | 21 | 7 | 5 | 5 | 12 | 13 | 14 | 14 | 7 | 78° |
| 17 | U. S. | M. | 63 | 21 | 7 | 4 | 5 | 12 | 14 | 14 | 14 | 7 | 77° |
| 18 | U. S. | S. | 68 | 21 | 7 | 5 | 5 | 12 | 13 | 13 | 14 | 7 | 72° |
| 19 | U. S. | S. | 64 | 21 | 7 | 5 | 6 | 12 | 14 | 15 | 15 | 7 | 78° |
| 20 | U. S. | S. | 67 | 21 | 7 | 5 | 5 | 12 | 14 | 14 | 14 | 8 | 78° |
| 21 | Germ. | S. | 65 | 22 | 7 | 5 | 5 | 13 | 14 | 14 | 14 | 7 | 76° |

The individuals in the preceding table, so far as was ascertained, were from the English-speaking race, or from the

German-speaking race. Eleven were or had been married. Ten were single. Some were teachers; some were writers; and some were heads of families. The least, the greatest and the average dimensions of Table No. VII, are recorded in the following table:

TABLE No. VIII.

Containing the least, the greatest and the average dimensions of the heads of 21 educated women, and the differences between the least and the greatest.

| DIMENSIONS. | LEAST. | GREATEST. | AVERAGE. |
|--------------------------------|----------------|----------------------------|---------------|
| Base-line | 4.75 inches. | 5.25 inches. 4.75 " | 5.10 inches. |
| Difference | | .50 inches. | |
| Transverse Diameter | 5.50 inches. | 6.125 inches. 5.50 " | 5.79 inches. |
| Difference | | .625 inches. | |
| Antero-post Diameter | 6.875 inches. | 7.75 inches. 6.875 " | 7.43 inches. |
| Difference | | .875 inches. | |
| Circumference | 20.125 inches. | 22.625 inches. 20.125 " | 21.72 inches. |
| Difference | | 2.5 inches. | |
| Anterior Arch | 12. inches. | 13.25 inches. 12. " | 12.72 inches. |
| Difference | | 1.25 inches. | |
| Frontal Arch | 13.25 inches. | 14.50 inches. 13.25 " | 13.90 inches. |
| Difference | | 1.25 inches. | |
| Middle Arch | 13.75 inches. | 14.75 inches. 13.75 " | 14.37 inches. |
| Difference | | 1. inch. | |
| Superior Arch | 13.75 inches. | 15.50 inches. 13.75 " | 14.53 inches. |
| Difference | | 1.75 inches. | |
| Posterior Arch | 7.125 inches. | 8.25 inches. 7.125 " | 7.76 inches. |
| Difference | | 1.125 inches. | |
| Masto-frontal Angle | 70° | 78° 70° | 74° |
| Difference | | 8° | |

From the above Table may be drawn the following conclusions in regard to the heads of 21 educated women, namely:

- (1) The average base-line is 5.10 inches.
- (2) The average transverse diameter is 5.79 inches.
- (3) The average antero-posterior diameter is 7.43 inches.
- (4) The average circumference is 21.72 inches.
- (5) The average anterior arch is 12.72 inches.
- (6) The average frontal arch is 13.90 inches.
- (7) The average middle arch is 14.37 inches.
- (8) The average superior arch is 14.53 inches.
- (9) The average posterior arch is 7.76 inches.
- (10) The average masto-frontal angle is 74° .
- (11) The least variation in any linear dimension is in the base-line: the variation being five-tenths of an inch.
- (12) The greatest variation in any linear dimension is in the circumference: the variation being two and five-tenths inches.

TABLE No. IX.

Containing the average dimensions of the heads of 21 educated and 21 uneducated women; also the difference of their dimensions.

| AVERAGE DIMENSIONS. | 21 EDUCATED WOMEN. | 21 UNEDUCATED WOMEN. | DIFFERENCES. |
|------------------------|--------------------|----------------------|------------------------------|
| Base-Line, | 5.10 inches. | 5.047 inches. | $\frac{5}{100}$ of an inch. |
| Transverse Diameter, | 5.79 inches. | 5.755 inches. | $\frac{4}{100}$ of an inch. |
| Antero-post. Diameter, | 7.43 inches. | 7.375 inches. | $\frac{6}{100}$ of an inch. |
| Circumference, | 21.72 inches. | 21.613 inches. | $\frac{12}{100}$ of an inch. |
| Anterior Arch, | 12.72 inches. | 12.565 inches. | $\frac{16}{100}$ of an inch. |
| Frontal Arch, | 13.90 inches. | 13.803 inches. | $\frac{9}{100}$ of an inch. |
| Middle Arch, | 14.37 inches. | 14.344 inches. | $\frac{3}{100}$ of an inch. |
| Superior Arch, | 14.53 inches. | 14.434 inches. | $\frac{10}{100}$ of an inch. |
| Posterior Arch, | 7.76 inches. | 7.994 inches. | $\frac{23}{100}$ of an inch. |
| Masto-frontal Angle, | 74° . | 70.2° . | 3.8° . |

(13) The next greatest variation in any linear dimension is in the superior arch: the variation being one and six-tenths inches.

(14) The variation in the masto-frontal angle is 8° .

The average dimensions of the heads of 21 educated women and 21 uneducated women are noted, and the differences expressed in the following table:

From Table No. IX may be drawn the following conclusions, namely:

1. The base-line, the transverse diameter, the antero-posterior diameter, the circumference, the anterior arch, the frontal arch, the middle arch, the superior arch, and the the masto-frontal angle were comparatively greater in the heads of 21 educated women than in the heads of 21 uneducated women.

2. The posterior arch was greater in the heads of 21 uneducated women than in the heads of 21 educated women.

3. The anterior arch shows the greatest increase in favor of the heads of educated women.

4. The masto-frontal angle shows an increase of 3.8° in favor of educated women.

5. The antero-posterior diameter is greater and the posterior arch is less in the heads of 21 educated women than in the heads of 21 uneducated women.

6. The frontal arch is greater in the heads of 21 educated women than in the heads of 21 uneducated women.

7. Hence, it is indicated that the head of an educated woman has relatively more brain in the anterior part of the cranial cavity than the head of an uneducated woman.

8. And this would leave the further indication that the head of an uneducated woman has relatively more brain in the posterior part of the cranial cavity than the educated woman.

9. In this respect the brain of an educated woman resembles the brain of men.

In the next place, it will be important to determine the differences in the variations of the dimensions of the heads of educated and uneducated women. These variations and their differences are noted in the following table :

TABLE No. X.

Containing the variations and their differences in the dimensions of the heads of 21 educated and 21 uneducated women.

VARIATIONS IN.

| DIMENSIONS. | 21 EDUCATED WOMEN. | 21 UNEDUCATED WOMEN. | DIFFERENCES. |
|------------------------|--------------------|----------------------|--------------|
| Base-Line, | .5 inches. | .87 inches. | .37 inches. |
| Transverse Diameter, | .62 inches. | .75 inches. | .13 inches. |
| Antero-post. Diameter, | .87 inches. | 1.25 inches. | .38 inches. |
| Circumference, | 2.5 inches. | 3.25 inches. | .75 inches. |
| Anterior Arch, | 1.25 inches. | 2.87 inches. | 1.62 inches. |
| Frontal Arch, | 1.25 inches. | 2.5 inches. | 1.25 inches. |
| Middle Arch, | 1. inch. | 2. inches. | 1. inch. |
| Superior Arch, | 1.75 inches. | 2.5 inches. | .75 inches. |
| Posterior Arch, | 1.12 inches. | 1.87 inches. | .75 inches. |
| Masto-frontal Angle, | 8°. | 16° | 8°. |

From Table No. X may be drawn the following conclusions, namely :

1. All the dimensions of the heads of 21 uneducated women have greater variations than the dimensions of the heads of 21 educated women.

2. This would indicate a greater difference between the least developed heads of the two classes of women, than between the most developed heads of the same two classes.

3. The masto-frontal angle varies twice as much in the heads of 21 uneducated women as it does in the heads of 21 educated women.

4. The anterior arch has a greater variation in the heads of 21 uneducated women than in the heads of 21 educated women, and the anterior arch varies more than any other arch.

5. The variation in the inter-mastoid arches constantly diminishes from the anterior to the superior arch inclusive.

6. *Hence it follows, that the heads of 21 uneducated women vary more in volume in the anterior part of the cranial cavity than the heads of 21 educated women.*

In this connection it may be well to state, that the average height of 21 educated women was about 63 inches, this is about one inch more than the average height of the full-grown female: and the average height of the 21 uneducated women was 62 inches, this is about the average height of the full-grown female. The average weight of the uneducated women was probably somewhat greater than the average weight of the educated women: so that, if the uneducated

TABLE No. XI.

Containing the variations and their differences in the dimensions of the heads of 21 educated and 21 uneducated men.

VARIATIONS IN.

| DIMENSIONS. | 21 EDUCATED MEN. | 21 UNEDUCATED MEN. | DIFFERENCES. |
|-----------------------|------------------|--------------------|--------------|
| Base-Line, | .62 inches. | 1.12 inches. | .5 inches. |
| Transverse Diameter, | 1.12 inches. | 1.12 inches. | |
| Antero-post Diameter, | .75 inches. | 1.12 inches. | .37 inches. |
| Circumference, | 1.87 inches. | 2. inches. | .13 inches |
| Anterior Arch, | 2.25 inches. | 2. inches. | .25 inches. |
| Frontal Arch, | 1.5 inches. | 2. inches. | .5 inches. |
| Middle Arch, | 1.25 inches. | 1.5 inches. | .25 inches. |
| Superior Arch, | 1.75 inches. | 2.5 inches. | .75 inches. |
| Posterior Arch, | 1.5 inches. | 1. inch. | .5 inches. |
| Masto-frontal Angle, | 5°. | 15° | 10°. |

class had belonged to the educated class, the head-dimensions of the former would have been equal to the head-dimensions of the latter.

In the next place, let us put the variations in the dimensions of the heads of 21 educated men and 21 uneducated men side by side in the same table, in order to compare and contrast their differences. These variations can be taken from my previous paper on Craniology. They are noted in the above table:

Table No. XI will give us the following conclusions, namely;

1. The base-line of the heads of 21 uneducated men has a greater variation by five-tenths of an inch than the base-line of the heads of 21 educated men.

2. The transverse diameters of the heads of 21 educated and 21 uneducated men have the same variation.

3. The antero-posterior diameter and the circumference of the heads of 21 uneducated men have a greater variation than the same dimensions of the heads of 21 educated men.

4. The anterior arch of the heads of 21 educated men has a greater variation than the anterior arch of the heads of 21 uneducated men.

5. The frontal arch, the middle arch, and the superior arch have greater variations in the heads of 21 uneducated men, than the same dimensions in the heads of 21 educated men.

6. The posterior arch has a greater variation in the heads of 21 educated men than in the heads of 21 uneducated men.

7. The masto-frontal angle in the heads of 21 uneducated men has a variation two or three times as great in the heads of 21 educated men.

Here a general conclusion may be drawn, namely:

The heads of educated men and women have less variation

in their dimensions than the heads of uneducated men and women.

The ratios of the average weights of the brains of educated women and educated men are about as 44 : 50, even taking into account the excess of the specific gravity of the brain of men, determined by Colombi and Pizzi. Hence the ratios of the volumes of the brains of educated women and educated men may be taken as 44 : 50 nearly.

TABLE No. XII.

Containing the average dimensions, and the ratios indicated by these dimensions, in the heads of 21 educated women and 21 educated men.

| RATIOS. | DIMENSIONS. | 21 WOMEN. | 21 MEN. |
|--------------|------------------------|--------------------|----------------------|
| (1.) 44 : 50 | Base-Line, | 5.10 ³ | 5.38 ³ . |
| | :: | 132.65 : | 155.7. |
| (2.) 44 : 50 | Transverse Diameter, | 5.79 ³ | 6.05 ³ . |
| | :: | 194.08 : | 221.43. |
| (3.) 44 : 50 | Antero-post. Diameter, | 7.43 ³ | 7.7 ³ . |
| | :: | 402.7 : | 456.53. |
| (4.) 44 : 50 | Circumference, | 21.72 ³ | 22.6 ³ . |
| | :: | 10246.41 : | 11543.17. |
| (5.) 44 : 50 | Anterior Arch, | 12.72 ³ | 13.7 ³ . |
| | :: | 2057.96 : | 2571.35. |
| (6.) 44 : 50 | Frontal Arch, | 13.90 ³ | 14.75 ³ . |
| | :: | 2685.61 : | 3209.01. |
| (7.) 44 : 50 | Middle Arch, | 14.37 ³ | 14.78 ³ . |
| | :: | 2967.26 : | 3228.54. |
| (8.) 44 : 50 | Superior Arch, | 14.53 ³ | 14.39 ³ . |
| | :: | 3067.57 : | 2979.73. |
| (9.) 44 : 50 | Posterior Arch, | 7.76 ³ | 8.15 ³ . |
| | :: | 467.22 : | 541.32. |

In order to determine the relative differences, if any, in the dimensions of the heads of educated men and educated women, let us compare the cubes of the similar dimensions of the two classes with the corresponding volumes of the brains, as was done in the case of uneducated women and uneducated men. This comparison of similar dimensions is noted in Table XII.

In regard to the ratios of the dimensions of the heads of 21 educated women and 21 educated men, from Table XII may be drawn the following conclusions, namely:

1. The ratio of 44:50 is greater than the ratio of 132.65:152.7. Hence the base of the brain of an educated man is comparatively greater than the base of the brain of an educated woman; but the excess in the volume is very small.

2. The ratio of 44:50 is about the same as the ratio of 194.08:221.43. Hence, in the transverse diameter, the volume of the brain is comparatively about the same in the heads of educated women and educated men: In this respect the two classes are equal.

3. The ratio of 44:50 is about the same as the ratio of 402.7:456.53. Hence in the antero-posterior diameter, the volume of the brain is comparatively about the same in the heads of educated women and educated men: In this respect the two classes are equal.

4. The ratio of 44:50 is less than the ratio of 10246.41:11543.17. Hence, in the circumference, the volume of the brain is comparatively greater in the heads of educated women than in the heads of educated men; but the excess in the volume is very small. The excess of the female head in the circumference is about the same as the excess of the male head in the base-line.

5. The ratio of 44:50 is considerably greater than the ratio of 2057.96:2571.35. Hence, in the anterior arch, the brain of an educated man has comparatively a greater vol-

ume than the brain of an educated woman. The difference in this respect is considerable.

6. The ratio of 44:50 is greater than the ratio of 2685.61:3209.01. Hence, in the frontal arch, the brain of the educated man has a somewhat greater volume comparatively than the brain of the educated woman. The excess of the male brain over the female brain is not so great in the frontal arch as it is in the anterior arch.

7. The ratio of 44:50 is less than the ratio of 2967.26:3228.54. Hence, in the middle arch, the brain of the educated woman has a somewhat greater volume comparatively than the brain of an educated man. The excess of the female brain in the middle arch is comparatively about the same as the excess of the male brain in the frontal arch.

8. The ratio of 44:50 is considerably less than the ratio of 3067.57:2979.73. Hence, in the superior arch, the brain of the educated woman has comparatively a greater volume than the brain of an educated man. The difference in this arch is greater than the difference in any other linear dimension.

9. The ratio of 44:50 is about the same as the ratio of 467.22:541.32. Hence, in the posterior arch, the volume of brain is comparatively about the same in the heads of educated women and educated men.

10. *The volume of the brain in the region of the anterior and frontal arches is comparatively greater in the heads of 21 educated men than in the heads of 21 educated women.*

11. *The volume of the brain in the region of the middle and superior arches is comparatively greater in the heads of 21 educated women than in the heads of 21 educated men.*

12. *The anterior and superior arches show the greater differences. The frontal and middle arches show the lesser differences; and the two curves of the two sets of heads will cut each other somewhere between the frontal and the middle arches.*

In the meantime, before considering the relations of the masto-frontal angle, let us go over some points of variation in the dimensions of the heads of 21 educated women and 21 educated men. These variations and their differences are noted in the following table :

TABLE No. XIII.

Containing the variations in the dimensions of the heads of 21 educated women and 21 educated men, and the differences.

VARIATIONS IN.

| DIMENSIONS. | 21 EDUCATED WOMEN. | 21 EDUCATED MEN. | DIFFERENCES. |
|------------------------|--------------------|------------------|-----------------|
| Base-Line, | .50 inches. | .625 inches. | M. .125 inches. |
| Transverse Diameter, | .625 inches. | 1.125 inches. | M. .50 inches. |
| Antero-post. Diameter, | .875 inches. | .75 inches. | W. .125 inches. |
| Circumference, | 2.50 inches. | 1.875 inches. | W. .625 inches. |
| Anterior Arch, | 1.25 inches. | 2.25 inches. | M. 1. inch. |
| Frontal Arch, | 1.25 inches. | 1.50 inches. | M. .25 inches. |
| Middle Arch, | 1. inch. | 1.25 inches. | M. .25 inches. |
| Superior Arch, | 1.75 inches. | 1.75 inches. | .00 inches. |
| Posterior Arch, | 1.125 inches. | 1.5 inches. | M. .375 inches. |
| Masto-frontal Angle, | 8°. | 5°. | W. 3°. |

From this table may be drawn the following conclusions, namely :

1. The educated male brain varies more in volume in the region of the base-line and the transverse diameter than the educated female brain.

2. The educated female brain varies more in volume in the antero-posterior diameter than the educated male brain.

3. The educated female brain varies more in circumference than the educated male brain.

4. The volume of the educated male brain varies more

in the region of the anterior, frontal and middle arches than the volume of the educated female brain.

5. The educated male brain and the educated female brain have the same variation in the region of the superior arch.

6. The volume of the educated male brain has a greater variation in the region of the posterior arch than the volume of the educated female brain.

7. The masto-frontal angle varies more in the educated female head than it does in the educated male head.

It will now be convenient for comparison and reference to put the figures of the masto-frontal angles of 21 educated men and 21 educated women side by side in the following table :

TABLE No.XIV.

Containing the Masto-frontal Angeles of 21 educated men and 21 educated women.

MASTO-FRONTAL ANGLE.

| No. | 21 EDUCATED WOMEN. | 21 EDUCATED MEN. |
|-------------|-----------------------|---------------------|
| 1 | 75° | 78° |
| 2 | 72° | 79° |
| 3 | 71° | 79° |
| 4 | 71° | 80° |
| 5 | 70° | 82° |
| 6 | 74° | 80° |
| 7 | 72° | 79° |
| 8 | 73° | 80° |
| 9 | 72° | 78° |
| 10 | 78° | 79° |
| 11 | 73° | 79° |
| 12 | 75° | 79° |
| 13 | 75° | 77° |
| 14 | 75° | 82° |
| 15 | 71° | 80° |
| 16 | 78° | 81° |
| 17 | 77° | 82° |
| 18 | 72° | 81° |
| 19 | 78° | 81° |
| 20 | 78° | 78° |
| 21 | 76° | 81° |
| Least, | 70° | 77° |
| Greatest, | 78° | 82° |
| Average, | 74° | 79.75° |
| Difference, | 8° | 5° |

From the above table may be drawn the following conclusions, namely :

1. The least masto-frontal angle of the heads of 21 educated women is 70° .
2. The greatest masto-frontal angle of the heads of 21 educated women is 78° .
3. The average masto-frontal angle of the heads of 21 educated women is 74° .
4. The variation in the masto-frontal angles of the heads of 21 educated women is 8° .
5. The least masto-frontal angle of the heads of 21 educated men is 77° .
6. The greatest masto-frontal angle of the heads of 21 educated men is 82° .
7. The average masto-frontal angle of the heads of 21 educated men is 79.75° .
8. The variation in the masto-frontal angles of the heads of 21 educated men is 5° .
9. The difference between the least masto-frontal angles of the two classes is 7° .
10. The difference between the greatest masto-frontal angles of the two classes is 4° .
11. The difference between the average masto-frontal angles of the two classes is 5.75° .
12. The difference between the variations of the masto-frontal angles of the two classes is 3° .

The difference in size of the inter-mastoid arches has already indicated that the brain of the educated male preponderates in the anterior part of the cranial cavity over the brains of the educated female. We may now add to this conclusion two important facts, namely :

(1.) *On account of the greater size of the masto-frontal angle in the head of the educated male, the volume of the brain in the anterior part of the cranial cavity would be*

greater on the average in the head of the educated male than in the head of the educated female. The additional volume in the head of the educated male, so far as the masto-frontal angle is concerned, would be represented by a segment of the inferior and anterior part of the brain, whose linear dimensions are expressed by the base-line, the anterior arch, and the excess of the masto-frontal angle, which is about five and one-half degrees.

(2.) From the line of the anterior arch to the line of the frontal arch the size of the head has a notable increase, both in the male and the female: now, if the anterior arch in the male were measured so as to make the angle between it and the superior arch equal the average masto-frontal angle of the educated female, then the anterior arch would have a greater average size than is expressed in our table of measurements of the heads of educated men. Hence, if the real average anterior arch in the head of the educated male, and if the arch on the male head, measured in the place of the anterior arch of the head of the educated female, are both greater than the anterior arch of the educated female head, the previous conclusion, that the educated male brain preponderates over the educated female brain, in the anterior portions, is greatly strengthened. That is, because the anterior arch is comparatively greater in the educated male brain than in the educated female brain, and because the masto-frontal angle is greater in the educated male brain than in the educated female brain, and because the anterior arch is measured at a comparatively lower level in the male brain than in the female brain, it follows that the head of the male has more brain in the anterior part than the head of the female.

In my previous paper it was stated that the masto-frontal angle of the skulls was smaller on the average than the masto-frontal angle of the heads of 21 uneducated men. It seems to be possible now to explain this in a satisfactory

manner. Some of the skulls then measured must have been from females. In this paper it has been shown that the masto-frontal angle is smaller in the uneducated female than in the uneducated male. Hence, the volume of the anterior parts of the skulls then measured would be less than that of the average uneducated male. And if the said skulls had all been from females, the difference then pointed out would have been considerably greater. But if the skulls had all been from males, the difference would have been less, or quite insignificant.

From what has already been brought forward, some important general propositions may be formulated, namely:

1. The brain of the educated male has a comparatively greater volume in the anterior part of the cranial cavity than the brain of the educated female.

2. The brain of the uneducated male has a comparatively greater volume in the anterior part of the cranial cavity than the brain of the uneducated female.

3. The volume and form of the brain of the uneducated male somewhat nearly resemble the volume and form of the brain of the educated female.

4. While in regard to the relations of education, there is greater variation in the development of the anterior part of the brain of the female than the male,—it may be remarked that the difference between the lower female brain and the higher male brain is very considerable.

5. The brain of the female shows as great a capacity for development by education as the brain of the male.

6. Under similar circumstances of mental work and heredity the female brain would fully equal the male brain.

7. *There can be no question that females ought to receive a higher education.*

8. One cause of the deterioration of race is the lowly condition of the female.

9. One cause of the amelioration of race is found in the better brain-development of the female.

10. The female should have a higher education,—in the interest of herself, the male, and the well-being of the race.

11. An abundance of historical evidence can be adduced to show the soundness of these general propositions that have been drawn from careful comparative measurements and calculations.

12. *The above conclusions will be supported by the facts of imperfect development operating as causes of diseased conditions.*

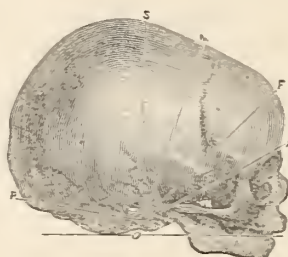


FIG. 2.

Skull of an infant at birth—full period.

ELEMENTARY LESSONS IN ELECTRICITY.

IV.

By A. FLOYD DELAFIELD A. B.

IN the last paper I gave the principles on which batteries must be selected and combined in order to produce a desired effect on any circuit. Illustrations of these principles will occur throughout the remainder of this series.

The measurement of battery currents is nearly always effected by observing their influence on magnets, and it will therefore be necessary to speak briefly of magnetism, and then to discuss the magnetic effects of the electric current.

IX.—A magnet is a body affected by a force which tends to make it take up a position influenced only by electric currents, by the earth and by certain substances called magnetic, and which attracts and is attracted by the magnetic substances.

Iron has the magnetic property in the highest degree; nickel and cobalt are the only other substances which possess it in a degree sufficient to be observed without special apparatus.

Magnets are of two kinds—permanent and temporary. Permanent magnets are generally made of steel; they are best magnetised by laying their ends on those of very powerful electro-magnets, which will be described further on.

On removing the steel from the electro-magnet it is found to have acquired an amount of magnetism depending on its size, its temper, the strength of the electro-magnet and the time during which the steel has been in contact with the electro-magnet.

Each piece of steel can hold a certain amount of magnetism which cannot be exceeded, no matter how strong the source of magnetism nor how long the steel is left in contact with it; when the steel has this degree of magnetism it said to be saturated.

The harder the temper of the steel, the more slowly will it acquire magnetism and the longer will it retain it. For every specimen of steel a particular temper is found to be the one at which it will acquire the strongest charge. Magnets bought at the shops are usually of a straw temper, as at a higher temper steel is brittle and liable to accident.

In every magnet there are two points, one near each end, called poles. The poles are centres of magnetic force, that is, the magnetic force radiates from each of them in all directions.

An imaginary line through the poles is called the axis of the magnet. If the magnet is suspended by a thread or balanced on a point, so that its axis is horizontal or nearly so, it will take up a position such that the axis will be about north and south.

The pole of the magnet which seeks the North Pole, is called, in English-speaking countries, the north pole, and the other the south pole.

The north pole attracts the south pole of another magnet and repels its north pole, and the south repels a south and attracts a north pole.

The poles of a magnet are readily found by holding the magnet over a sewing needle thrust through a piece of cork and floating in a vertical position in a basin of water. On

presenting the magnet to the needle this will move at once to the nearest pole of the magnet, and if it be allowed to touch the magnet will itself become magnetised.

On removing the magnet and presenting the other pole to the needle, this will be repelled, because it has acquired a pole opposite to that which it first touched, and consequently similar to the one which is now presented. To find the position of the second pole we must invert the needle, when it will be attracted to the pole and show its position exactly.

Temporary magnets may be made by holding a piece of iron in contact with a magnet; the iron is found to possess magnetic powers which disappear when it is removed from the magnet.

Either end of the iron will afterwards be attracted by either pole of the magnet.

We say that iron is a magnetic substance because it is affected by magnets; but we call a piece of magnetised steel a magnet because it has a distinct polarity, each end being attracted by one pole of a magnet and repelled by the other, while a piece of iron is affected indifferently by both.

The ordinary way of making temporary magnets is to conduct around a piece of soft iron a current of electricity. The reason why the circulation of a current of electricity around a piece of iron should make it a magnet is not at all understood; that, however, is what takes place.

The principal use to which electricity has thus far been put has been to produce temporary magnetism in this way. Magnets thus made are called electro-magnets; they are the basis of all systems of telegraphy.

It is, however, quite unnecessary to get magnetic action that any iron should be present; the passage of a current through a conductor is sufficient to affect magnets near it.

The laws which govern the magnetic effect of a current are these :

The magnetic effect of a current is directly proportioned to

The length of the conductor,
The strength of the current ;

And is diminished in proportion to

The square of the distance of the conductor from the body affected.

To get a strong magnetic effect from a given current on a small suspended magnet, we therefore want to have all parts of the circuit as near the magnet as possible. This is accomplished by using as a conductor a coil of wire wound with silk or cotton ; the turns of the coil being all nearly parallel to each other they all act together on the magnet, and the silk or cotton covering by separating the wires from each other forces the current to follow the entire length of the wire. As all turns of the coil at the same distance from the magnet have the same effect on it, the total magnetic effect of the coil on the magnet will be equal to that of one turn of the coil at the average distance from the magnet of all the turns, multiplied by the number of turns in the coil.

We can say then that the magnetic effect of a current through a coil of wire on a magnet near it is proportional to

The strength of the current,
The number of turns in the coil ;

and is diminished in proportion to

The square of the average distance of all the turns of the coil from the magnet.

This will be true whatever be the strength of the current or the number of turns in the coil.

Instruments in which the effect on a magnet of a current through a coil of wire is used to determine the strength of the current are called galvanometers.

X.—In order that a given current shall be best measured by a galvanometer, we must use coils of wire in this of a length and thickness appropriate to the particular circuit ; for while the magnetic effect of a current is increased by adding to the number of windings in a coil, it is also decreased as the windings recede from the suspended magnet ; the only way to get a large number of windings close to the magnet is to use very thin wire ; but a large number of turns of very thin wire offers a very large resistance to the passage of the current. It depends then on the resistance of the rest of the circuit, whether the resistance of the galvanometer is more important than the increased effect of a large number of windings close to the galvanometer magnet, or vice versa.

To illustrate this point, let us suppose that we have two galvanometers, one having a long coil of thin wire, whose resistance is 1000 ohms, and the other having a single turn of wire $\frac{1}{4}$ inch thick, whose resistance is so small that it may be considered zero.

If we connect with the first galvanometer one cell of gravity battery with an electromotive force of 1 volt and a resistance of 2 ohms, we shall get a deflection, which can be regulated by placing near the galvanometer a magnet. Having observed this deflection, let us introduce into the circuit another cell exactly the same as the first, connecting its zinc with the zinc, and its copper with the copper of the first ; we shall be unable to observe any difference in the deflection, because we have merely halved the resistance of the battery, which was already an inconsiderable part of the resistance of the whole circuit. If however, we connect the two cells in series, the deflection will be doubled ; for the electromotive force is doubled while the resistance is not materially increased. Batteries are said to be connected in series when the zinc of one is connected to the copper or carbon of the next. If all the zincs are connected together

and all the coppers with each other, the cells are said to be connected in multiple arc.

If we now substitute for the first galvanometer the second, which has only a single turn of thick wire, we shall get, on repeating these experiments, results exactly contrary to those obtained with the first galvanometer. Here the resistance of the batteries is the only important resistance in the circuit, and halving it, by connecting the two cells in multiple arc, doubles the strength of the current; while in connecting the batteries in series, although we get twice the electromotive force of one cell we also have twice its resistance; the current will consequently have the same strength as with only one cell.

PSYCHO-PHYSIOLOGICAL TRAINING OF AN IDIOTIC HAND.*

By EDWARD SEGUIN, M. D.

SOME idiots are more afflicted in their minds, even to the verge of insanity, and others in their motor and sensory functions, even to the point of paralysis or of anæsthesia, but in either form their treatment must proceed more from the training of the senses, in order to improve the mind, than from the education of the mind in view of developing the sensory aptitudes.

The following case illustrates this point. In order to save time I brought with me the portraits of this child: 1st. Six months old, healthy. 2d. Eighteen months old, after convulsions. 3d. Aged seven years, with the characteristics of idiocy enlarged, particularly those furnished by the hand; and, 4th. One year later, showing the improvement brought on by the well-directed devotion of an intelligent woman.

Accurate as are these photographs by a talented and faithful artist, they do not give the full attitude of the child, his weak standing, want of support, erratic walk, unclean habits and absolute impermeability to the ordinary means of education.

His appetite was good, satisfied coarsely; he was subject

* Read before the British Medical Association at its annual meeting, held at Cork, August 8, 1879.

to rush of blood to the head, sudden redness of the ears and fits of passion, during which he would bite his hand, or, by a sort of insanoid propensity, strike his brother and directly kiss him with the marks of the most sincere affection. (For something similar to this see the psychological study of a fated hand by Gérard de Nerval, in *La Main Enchantée*.)

The hand of R. is small, the nails short and brittle, fingers as if unfinished, no power, no skill, only automatic movements, mainly from the wrist. How well it shows that there are in idiocy muscular incapacities as well as intellectual ones—incapacities which may be regional, also specific in each region.

To make the hand of R. act on command was at first out of question. He could not put it or the fingers in any given attitude. He could not rotate on command that wrist so nimble when striking or vibrating automatically. He could obey the movements of elevation and abduction of the arm, but not always, nor with anything like precision.

Therefore his teacher had to begin the training of that hand from the shoulder by movements which, starting from the elevators of the arm, would involve successively the muscles of the arm and the hand. Thus, by a series of operations, whose willed or obedient starting point descended gradually from the spine, the child became capable of moving his hand and fingers by imitation at first, and *proprio motu* for simple willed operations, later.

These operations of the hand are too many to be enumerated, but can be comprised under several heads, abstractly of their object; as to hold passively and take hold willingly; to lift, grasp, support, let go, throw, catch, collect, trace, delineate, compress, curb, break, cut, pierce, pass through, model, assemble, group, combine, connect, unite, fasten, separate, divide, tear asunder, peel off, cut with knife, scis-



Fig. 1.



Fig. 2.



Fig. 3.



Fig. 4.

sors, saw and a hammer, pull in, up, down, away. And, if we consider that so many operations have to be taught in relation to an infinite number of objects, as, for instance, cutting hundreds of bodies of variable density and modes of resistance, besides all the minutiae of the acts of common life, of which R. was incapable.

The teaching of these operations (most of which ordinary children learn at a glance, or by a *tour de main*, and soon entrust to automatism) was out of the question. Whereas the training of physiological aptitudes engaged in them was the question.

The intellectual value of these exercises (brachial, manual or digital) will depend on their precision, rapidity, unity, singleness or complexity, as the case and the period of training will indicate. The problem is this: How shall the child notice our movements, take an image of them, transmit this image with the order for its execution to his extremities, in the most accurate manner and by a non-interrupted act of volition (even when he does not want to do anything). Here is the mind disengaged from matter by another mind; that is one of the operations of the psycho-physiological training.

Now for the application.

In the first place, the movements commanded to R. were those commencing nearer the spine; the *Trainer* gradually extending the operations of the will (the will communicated to the pupil by imitation or command) to the groups of muscles approaching the extremities. Thus the limb in training, not only became capable of a few willed movements of totality—later applicable to a great number of operations and convertible into smaller movements of the farther extremities—but the mind being drilled to be carried over regions previously ruled by automatism alone, extended its dominions and circulated as if at home, from the

great centres to the most delicate groups of sensitive and contractile tissues at the periphery, and soon thence reached centripetally.

To illustrate the difference of ability of the hand during these forms of training, according to the origin of the impulse, I notice the freedom of the hand of R. when driving nails in a board with a hammer—a movement of the arm and wrist—as against the sliding of the pin he holds, with the intention of piercing holes in a paper with but rare success—a movement confined to the last phalanges of two fingers.

In the second place, when these reciprocal conductions between the mind and the periphery, and mainly from the periphery to the centre were taking place, the invitations to the periphery, not only to enter in action, but to provoke the centres of intelligence, were incessant. Let us mark it: the hand was many times a day trained, either with or without the help of the other senses, to act and to feel, and to extend constantly with the range of its own operations that of the mind.

I have hardly the place here for the necessary remark that the interference of another sense—say vision—may be favorable to the development of the one sense in training—say here the muscular or tactile—or may prevent it, by offering to it, instead of a co-operation, a substitute, as the touch does rightly for the blind who *cannot see*, and wrongly for the idiot who *will not look*.

With a skillful trainer of idiots, who knows how to avoid this substitution, the co-operation of two senses is precious. By it the idiot passes from the tactile sensations to the visual ones, and from the perception by the eye to the execution by the hand. There is a whole volume to be told on this single psycho-physiological process.

To resume, the main point is to rapidly bring the will to-

wards the sentient and efficient extremities, and conversely.

But next to the rule, which suits all, come the exceptions to suit the idiosyncrasies. The anomalies of the hand of R. viz: short fingers, ill-supported by the nails, and the lifeless flabbiness of the integuments commanded to his teacher, Miss M. E. Mead, to invent constantly and to use perseveringly means calculated to elongate and strengthen the fingers.

In marked contrast was the training of the hand of Eth., a girl æt. 6.

That hand was rigid, unyielding, unsteady (somewhat choreic). Her teacher, Miss M. Coc, used long *rests* previous to short exercises of precision, and I have no doubt I will on my return, find that hand ready for delicate operations.

But it may be asked, what has been done all this while for the mental culture of the principal subject of this notice? Has he learned to read, write, and the sequel? No, his hand has learned to help himself, to amuse himself, to not bite itself, nor to slap his friends; though it is yet sometimes subject to its automatic agitations. His tact has been cultivated to the point of being conscious of the ordinary variations of the temperature, of water, food, etc.; and of recognizing and naming (without the help of sight) about fifty things by their shape, and quite as many by their texture. His eye—after his touch—has been drilled to appreciate the typical forms in substance at first, and later painted, delineated and hardly indicated; then to cut the same out of paper, etc. In regard to the appreciation of dimensions R. can find out objects gradually shorter or longer, and arrange them accordingly. (This training of the eye helped by the tact—the reverse of the precedent exercises—gave occasion for a little comedy which has not lost yet its actuality in some parts of the world. R. was getting along with his

experimental study of dimensions, taking pleasure in measuring all sorts of things at home and at the promenade by decimetres and centimetres, with the metre I had given him, which he kept proudly in his pocket; when his father, who had made his fortune by the yard, said that he wanted his son to abide by it. His teacher had to return to me the obnoxious metre.)

But does R. know at least his letters? No. But having shown a taste for flowers he goes to the florist almost every day. There he has learned to scent, to recognize and name about thirty flowers without fail and more with less certainty;—all fragrant, be it noted. But the main point gained in his contact with flowers, one which the knowledge of the letters could not have given him, is that not only he knows, but loves the flowers; is ready to plant and nurse them; treats his little bouquet on the mantlepiece with fresh water every morning, after coming to breathe its scent when handling it with a perfect delicacy.

This phase of his sensorial education seems to have had a decided influence on his constitution, diminishing the cerebral congestions, the automatism, and the outbursts of temper, particularly in his family intercourse. Altogether his moral improvement is perfectly reflected in the mellow tenderness of his fourth and last portrait.

But when will R. be taught to read? When his senses will have conveyed to his mind more correct objective impressions. His store of ideas, of names, qualities and actions is yet too small. He is in this respect like the peasant who knows so little that he needs neither letters to register his knowledge nor figures to calculate his small earnings; so R. is yet unalphabetic, but when he will be put in possession of the art of reading, he shall not be exposed by an imbecile teacher to read what he does not understand, because for a long time he will be taught to read only what he will

have written, and write only what his mind shall dictate to his hand. These are a few of the established features of the physiological education of the child who is yet in course of training, and whose training has been concentrated mainly on his most deficient organs, the hands. Next winter his eye, whose functions are yet very imperfect, will be the central object of his intelligent teacher.

Here we can part with the case, but not suppress the remarks which naturally issue from results: Rapid harmonization and filling up of the cranium, particularly in its lower frontal region; moralizing and intellectualizing realising influence of the training of a special sense. This form of training the young are still taught to consider as having materialistic tendencies, whereas it has proved in the case of R. and of many children of his class, to be eminently idealistic.

We are so used to locate idiocy in the brain that the idea of an *idiotic hand* seems, at first enunciation, like a grammatical blunder. But we become reconciled to the idea the moment we see the mutual dependence of the centres and the periphery, with a greater possibility of acting on the centres from the periphery than on the periphery from the centres, at least in the period of growth.

That the *initiative* of a certain order of capacities, therefore of antipodal incapacities, resides in the periphery and sensibility.

Therefore, instead of referring all the *initiums* to the *basilic* brain, or co-locating it in the triumvirate brain, spinal cord and sympathetic, we must recognize the power of the million of peripheric brains to give the impulse as well as to receive it.

If the idiot whose case is represented to you has improved under the care of his good teacher: if hundreds of others improve in the public institutions (under the care of women

whose names are never pronounced with sufficient respect), the sovereignty of the brain is at an end, and the new physiological doctrine of decentralisation contains in germ a new doctrine and new methods of education.

Since this paper was read I have received the following confirmation of the views herein supported :

New York, 23. 7. 1879.

“Returned from my month’s vacation, R. gave me a hearty welcome, and seemed quite anxious to work again. As yet I do not see that he has forgotten anything previously taught. His hands show that they have done nothing. I was pained to find them so soft and lifeless.

E. M. M.”

Thus, what was gained mentally through the senses—mainly through the hand—remained acquired to the mind. But the training of the hand having been too soon discontinued, the hand relapsed in its former “lifelessness.”

Explanation of the plate lithographed from photographs :

FIG. 1.—R. at the age of 6 months: healthy.

FIG. 2.—R. at the age of 13 months, after convulsions.

FIG. 3.—R. æt 7 years, with idiotic look and hands.

FIG. 4.—R. one year later, after psycho-physiological training.

CHOREIC AND CHOREIFORM MOVEMENTS IN HYSTERICAL CHILDREN.*

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THAT there is a close relationship between the neuroses is no new matter. The fact that a person subject to migraine will sometimes develop epilepsy, and *vice versa*; the association of hysteria and epilepsy, in what is known as hysterio-epilepsy; the frequency with which some one neurosis in the parent will be transmitted in some kindred but by no means necessarily identical shape to the child, are illustrations of this law. It would seem as if those finer molecular alterations, which have as yet eluded the ken of our modern instruments of precision, and which for lack of knowledge we style "functional," had a tendency to migrate through different tracts of the brain and cord with a facility that is foreign to the grosser and more irremediable lesions. A hemorrhage, an embolus, or a thrombus will necessarily only affect the region of distribution of the artery which is ruptured, or in which this embolus or thrombus is formed; but the changes in the nerve-tissue set up by this outburst of blood or this hindrance to the circulation will often be propagated to a distance, following their course along certain strands of nerve-fibres that are directly connected with

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the primary focus of evil, and not encroaching upon other strands immediately adjacent. An extravasation of blood, for instance, into the anterior third of the internal capsule or into certain portions of the convolutions, will induce secondary degenerations in those columns of the cord bordering directly upon the anterior median fissure, which Flechsig has designated as the direct pyramidal columns, and also in that division of the lateral tract which begins to pass under the name of the crossed pyramidal column. Idiopathic diseases of the spinal cord, too, usually cling to a certain system of fibres. Thus, the lesions of locomotor ataxia are confined to the columns of Burdach, or if they diverge into the neighboring columns of Goll, they do so irregularly and for short distances. Disseminated sclerosis, and some forms of myelitis involving the cord in a widespread destruction, are, to be sure, by no means discriminate; nevertheless they never extend throughout whole systems of fibres, and they are exceptional. But among the neuroses a migraine, with all its wide range of symptoms, will be transmuted into an epilepsy, with its entirely distinct and still wider range of symptoms; or the neuralgiæ and simple "nervousness" in the one generation will crop forth as an epilepsy in the next; or hysteria will be conjoined with epilepsy, or alternate with it; or, finally, as it is the object of this paper to relate, hysteria may co-exist with chorea and a condition closely allied to chorea. In some late lectures M. Charcot* has given an interesting description of certain cases of chorea witnessed in hysterical girls, in which the movements are rhythmical, the head and body being alternately swayed backward and forward as in a profound obeisance, at the same time that the upper extremities go through a movement as in swimming, whilst the lower extremities are alternately flexed and extended.

* *Progrès Médical*, 9 et 16 Févr., 1878.

So far as I am aware, however, the combination of hysteria with the ordinary type of chorea, such as we see it constantly in our practices and our clinics, has not been alluded to.

CASE 1.—Girl, American, aged 10. Fat and buxom. Has been subject to fainting spells, pain in stomach on rising in the morning, bad headaches for last two or three years. In last six months has had convulsions, sometimes three or four daily for a week, in other weeks none. Begins by complaining of her right side and groin and forehead, soon falls. Mother thinks she loses consciousness, but this is uncertain. Face becomes blue, foams at the mouth, eyes stare, movements irregular. Always knows that these fits are coming on so that her mother can catch her before she falls. Has never hurt herself in falling. No cry at the onset. Goes to sleep after the attack but never snores. Has globus. Is very emotional. When I gently hold her hands in mine, I feel at intervals a quick, jerky approximation of the thumb to the hand, or a faintly sharp extension or flexion of the fingertips, or a sudden movement of the cord-like tendons of the flexors in the wrist. In the feet I see distinct but slight extensions and flexions of the toes at intervals of a half or quarter minute, or an inward or outward movement of the foot or extension of the same. Also occasional movement of legs. Child sits restlessly. She has had these movements about six months. She came to me March 5, 1878. The liq. potass. arsenitis was ordered, gtt. iij. t. i. d.

March 7th.—Movements more marked, exactly choreic. Larger movements of limbs. To take gtt. v. t. i. d.

March 12th.—Movements very slight. At long intervals, as of a minute or more, scarcely perceptible wave, occasionally a large but still slight movement. Sniffs considerably.

March 19th.—Slight wave-like, quick movements of fingers and thumbs. Merely slight restlessness of legs. No movements of toes.

March 26th.—No movements in hands or feet, but a slight restlessness. Occasional shrug of the shoulder. Arsenic stopped.

After this no twitchings were visible. The paroxysms of hysteria had during this period of time been decreasing, and she has now not had one for over a month.

CASE 2.—Girl, American, aged 9. Child is subject to convulsions which are described by the mother thus: At first patient

becomes unconscious and falls, then lies quietly for a few seconds, or is stiffly stretched out; clonic convulsions ensue in all extremities, patient tossing and rolling and throwing head around, so that she would roll over and over, get on knees and hands, sometimes nearly stand on the head. Face very red. Mother thinks that consciousness is entirely lost at first, but when the convulsions commence it seems only obtunded, *i. e.*, she will answer questions petulantly, will say, "Come near me and I'll slap your face," etc. Child is usually very sweet-tempered and polite. Complains of beating pains in stomach in the intervals, occasionally before the attack. At end of attack she experiences the globus hystericus. No foam at mouth. No biting of tongue. Has been subject to these paroxysms about four months, coming once a week or several in a day. About eight months before first one, had a severe fall on the right temple, raising a large welt. Two days before first attack the child was put out of doors by her mother and greatly terrified. She was also severely whipped the ensuing day. Once or twice a week she will come to her mother in the early evening, drop her head on her mother's shoulder, and pass quickly off into a slumber for about twenty minutes. On one occasion had a convulsion after one of these naps. She has at times cramps of the fingers. There are slight but distinct twitches at long intervals in the fingers, such as we often see as a chorea is passing off. They are also present in the left toes, but none in the right. This patient was under treatment with the bromides for nearly two months without any great alteration. She then began to complain of symptoms which led me to suspect the presence of *ascarides vermiculares*, and an anthelmintic being prescribed, a number were passed. There was a temporary improvement, but matters soon returned to their former condition, and remained so in spite of a repetition of the vermifuge. The movements in the fingers changed somewhat in character, becoming tremulous, very fine, rather athetoid than choreic in the right fingers, occasionally a suggestion of a wave in the right toes. Finally, after having been under observation for about two months and a half, the patient was lost sight of.

CASE 3.—Girl, American, aged 12, Patient first came to me July 17, 1878, with the statement that she was suffering from chorea, of which she was stated to have had an attack three years before. There were moderate but distinct muscular movements in body and extremities. These movements were quick, sharp,

jerky, being mainly flexions in the toes, and like short shocks in the arms and legs. The body was relatively but slightly affected. There was nothing to distinguish these movements from those of chorea. The liq. potass. arsenitis, gr. iij + i. d. was ordered.

July 24th.—To-day the movements have in a large measure lost their jerky character and are more tremulous. I am informed by the mother that the girl is subject to convulsions, but I am unable to obtain any definite description of them, and cannot decide as to whether they are hysterical or epileptic.

July 26th.—To-day there is a jerky tremor, if I may so express it, of both upper extremities, *i. e.*, at the same time that each upper extremity as a whole is agitated by a fine tremor, the arm is occasionally and quickly twitched forward, and the carpal bones are sharply flexed on the first phalanges. The fingers do not twitch, however. There are decidedly jerky movements in the lower extremities, the left one being somewhat tremulous as well.

A few days afterward the patient had a series of hysterical paroxysms. The respiration would suddenly become loudly sobbing and puffing, the eyes would roll up, the patient would throw herself violently back against the chair, but never falling out of it, pain in the head was complained of and the hands were clasped around the head. Consciousness was not lost, and it was questionable whether it was even obtunded. When spoken to sternly, she would get up surlily and walk about quietly. Between the paroxysms, the twitching movements were found to have disappeared, but there was a tremulousness, better expressed as a *waviness*, of the arms, the arm as a whole being greatly agitated in its length from shoulder to wrist. When patient's attention was directed to something else, this motion ceased, and returned when I took hold of the member to examine it. Patient stutters, with a peculiar snapping movement of the jaws, like a spasmodic exaggeration of the movements which a person would make in quickly tasting an object. Mother states that she has always stuttered, but I had not observed this defect in my previous visits. As the paroxysms passed off, the movements ceased.

This patient soon after passed away from my charge, and I know nothing of the subsequent history.

CASE 4.—Boy, American, aged 11. Came to me Feb. 2, 1878. Patient's head is agitated by quick, jerking, nodding movements, consisting of continual quick nods to the front, or quick, seemingly petulant shakes to the side, alternating with more extensive jerks

in different directions. There is no order of succession in the movements. They are nearly constant, increased by excitement and mental attention, decreasing but not ceasing in sleep. They have existed for three years, onset having been gradual. At times quick muscular movements of the chest and abdomen are observed. Is subject to paroxysms in which he is confined to bed, with great pain in the head, pallor of the face, dilation of the pupils, and exaggeration of the movements. I have witnessed two of these attacks. In the first the pulse was 96, soft and weak, temperature 37.6° , respiration 28. Objects seem to him to jump around. Vertigo. When looking at an object, as a chair, he sees one-half of it only, always the left half, and in front of it would appear another half; and he sees double. The second attack was much more severe and prolonged. I was sent for hastily and found boy in convulsions. He was semi-unconscious, slinging his arms and legs about, shouting and yelling, snapping at anything touching him, and complaining of pain in the head. He had been ordered cathartics, which were acting briskly. He exhibited a lively perception of desire of defecation. The lips were covered with a thin froth, and subsequently dry retching began, followed still later by vomiting of yellow mucus. He was quieted with morphine hypodermically. This partially unconscious condition lasted for four days. When touched he would give vent to some petulant exclamation, and jerk himself away. He would give no response when shouted at. The appetite was voracious. Pupils largely dilated.

Automatic cerebral acts were still performed; for instance, if given a hammer and a stone, he would hammer the stone for hours at a time. This had always been a favorite amusement with him. When I gave him my hand, he would invariably, as was his wont, find my seal ring and finger it. He would murmur to himself about his childish plans and sports. At first he seemed in dread of some punishment, continually and piteously asking his mother: "Mamma, ain't I a good boy?" but he had not been punished in any way before his paroxysm. On the fifth day the automatic cerebral acts began to be glimmered over, as it were, by consciousness. When spoken to loudly, raised his head, and looked around dazedly. He came to recognize his father and mother sullenly. Began to play with his toys, jealously guarding them, and crying out lustily if an attempt were made to remove them. Would not recognize me. I had ordered a placebo, but was informed upon my next visit that the boy would

not take it. I then suggested putting it in his milk or food. I was next told that he would not take his milk or food, I there-upon stated to the mother in his presence that we would give him no more medicine, and requested her in private to put it in his milk or food. Thus deceived he took it. On the sixth day patient sat up in bed. Recognized his father and mother willingly, but insisted that he did not know me. I caught a glimmer of a smile on his face as he made this denial, and taxed him with it, trying to turn his face full to me, upon which he buried his face in the pillow. On the eleventh or twelfth day he was sufficiently recovered to leave his bed. He is a boy of considerable talent, stands always at the head of his class when at school, is remarkably ingenious mechanically, and is a remarkable draughtsman when his age and lack of instruction are considered. Is frail and delicate. His mother stammers greatly, is extremely emotional, and has no control over the child. An ophthalmoscopic examination was kindly made by my friend, Dr. Arthur Matthewson, who stated that the disk was rather hyperæmic and the retinal veins slightly fuller than normal, but failed to detect any organic changes. There was also a slight hypermetropia. The movements of the head were for a time improved greatly, even stopped entirely for a day or two, by the administration of the bromides of potassium and sodium, given in increasing doses to the supervision of slight bromism, when tonic doses of quinia and iron were taken to dispel the bromism. The improvement, however, was temporary; and since then no remedy has produced any relief. Arsenic is not tolerated at all by the patient, giving rise to intense headache, and once, apparently, bringing on an attack. Alcoholic stimulants are also badly borne.

In all of the patients there was unmistakable evidence of hysteria, that group of nervous affections which the pathology of the future will probably separate into several distinct clinical entities. The choreiform and choreic movements bore with equal distinctness the type of chorea, and were clearly distinguishable from the formless muscular agitations that usually accompany hysteria. It seemed to me also impossible that they could have been simulated. They were too precipitate, too short in duration, often too fine, too sharply limited to individual muscles and portions of

individual muscles, as in quick extensions of the ungual phalanges, to have been voluntary. Moreover, in Case I I observed a phenomena that was conclusive to my mind. In a number of choreic patients under my care my attention has been called to the curious circumstance that as the movements decrease in the extremities the fine muscles of the nostrils take on choreic action and the patient begins to sniff. This was precisely so in Case I.

The scanty number of these cases would not, of course, warrant me in predicating much that is positive in regard to prognosis and treatment. So far as they go, however, they would appear to indicate that the more closely the movements approach to the type of genuine chorea, the more likely they are to respond to treatment usually employed in chorea, and the better is the prognosis; that the more the movements resemble the irregular, semi-voluntary ones of hysteria, the more exactly will the prognosis and treatment be that of hysteria; and that finally, when the movements are similar to those intractable spasms of the muscles of the neck, as of the trapezius, splenius capitis, and sterno-mastoid, which so often exist without observable disease otherwheres, the more uncertain will the treatment be and the more indefinite the duration.

DIARRHŒA, ENTERO-COLITIS AND CHOLERA INFANTUM.

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THESE disorders so constantly run into one another, that they may be considered as possessing the same general characters, but varying in their severity and in the special elementary tissue of the alimentary canal chiefly affected.

Diarrhœa is most common in children during their second summer. During their first summer they are nursing, and if the mother's milk be in a good, wholesome condition, the infant passes through this period without any of these troubles, although it may be induced at this time if the mother's milk become in an unhealthy condition. It may, for instance, become overloaded with caseine, or be disordered from the use of improper food, or from constitutional or nervous causes.

But in the second summer, the child having been weaned, the irritation from dentition or from some morbid process may of itself suffice to produce it; or it may result from the effects of high temperature, errors in feeding, an attack of indigestion, impure air, a chill to the external surface, the use of ice-water, or from malarial or miasmatic influences.

Diarrhœa is only a symptom; it means excessive fluidity of the fæces, and is generally, but not always, attended by an increase in the number of the discharges.

The nature and character of the discharges are, therefore, important matters for consideration. The fæces may be loose and feculent; their fluidity varying from just that degree of looseness which prevents their maintaining their formed shape, to the consistence of cow's droppings. In such case the frequency of the discharges is generally not excessive. This is known as fæculent diarrhœa, or simple looseness.

The fæces may be serous or watery; either containing some fæcal matter dissolved in the fluid, or considerable mucus and not much proper fæces, or they may be but little more than effused serum, and this may have scattered through it small masses of coagulated albumino-fibrine. This form is known as serous diarrhœa.

The fæces may be chiefly composed of mucus, either alone or mixed with small amounts of fæcal matter. The mucus may be either tough and stringy, in flakes or sheets, in distinct separate nummular masses, or loose and shreddy and mixed with a small quantity of serum. Mucous stools may vary in color from being colorless to yellow, greenish, brown or very dark, its characters depending on the condition of the mucous membrane; thus in a simple diffuse erythematous condition the mucus will be just an increase of the natural secretion from the epithelial cells of the membrane; in a higher condition of inflammation it will be mixed with more or less albumino-fibrine, and will be correspondingly tough and stringy. In a severe inflammatory state the albumino-fibrine will be effused in too large a quantity to be held by the mucus, and it will coagulate, forming large shreds (or small, broken, rice-like masses if the serum is very abundant). This form is known as mucous diarrhœa.

The fæces may contain wholly undigested matter which have passed through the intestinal canal unchanged ; this is known as lientery.

A similar condition is found in infants, when the fæces are often composed of lumps of coagulated casein, which have passed through the intestines without having been in any way digested by the intestinal juices.

The fæces may contain more or less bile or be destitute of it entirely ; and the bile may be either mixed generally with the other matters, or be separate and distinct, forming bilious diarrhœa. In the absence of bile the color of the stools will be clay or ash colored ; if they contain bile, from the natural brown to all shades of yellow, green, and black, according to its quantity and quality.

The fæces may also be largely composed of pus, or of blood.

The reaction of the fæces may be either alkaline or acid ; if acid, they often emit a peculiar sour smell.

The odor of the fæces, as might be supposed from their biliary constituent, bears much resemblance to the odor of many of the sulphur compounds. When fermentative decomposition takes place in the intestines, their fætor may be undescribable. In dysentery the odor resembles that of putrid meat.

So important has the examination of the fæces been esteemed, that it has been attempted to form a nosological classification on this basis ; such a one is however defective, because similar physical appearances may result in the stools, from very different nosological conditions of the intestine.

It is however a fault equally grave to neglect the inspection of the fæces, for they give us information respecting the pathological condition of the intestines, obtainable from no other source, thus yielding valuable indications for treatment.

The characteristic symptoms of cholera infantum are copious thin, watery stools, vomiting, and rapid collapse, the biliary system being scanty or suppressed.

The exudation of serum in the stomach and the small intestines accords with the physiological actions of these parts. Their surface is largely a secretory organ, while that of the large intestine is more adapted for absorption. For the fæces are naturally passed into the cœcum in a fluid condition and are delayed in the sacculi of the colon for the absorption of their fluid parts.

Serous diarrhœa is the result of an increased exosmosis from the capillaries of the intestine, generally the result of over-distention from an increased quantity of blood. This hyperæmia may be caused by changes either on their arterial or on their venous side. If the latter, it generally arises from some obstruction to the circulation. For as the venous radicles which receive the blood from the intestinal capillaries unite to form the gastric and mesenteric veins, and these again unite with the splenic to form the portal vein; and as this vein breaks up into a fresh capillary circulation in the substance of the liver, the ultimate terminations of which form the radicles of the hepatic veins, which convey the blood to the cava inferior and thence to the right auricle of the heart; it follows that any obstruction to this capillary circulation in the liver, or to the hepatic veins, will gradually produce an increasing hyperæmia reaching to the extreme limits of the venous radicles and the capillaries of the intestines; and as the arterial supply continues unabated this constantly increasing hyperæmia will relieve itself by exosmosis of serum or effusion of blood. In this way hepatic obstruction in infants may be one factor in the production of infantile diarrhœa in some cases.

But capillary hyperæmia may be the result of changes on their arterial side; thus a paretic condition of their vaso-

motor nerves will allow the dilatation of the arterioles from ordinary blood-pressure; the excess of blood not finding a sufficient return channel through the veins, gradually accumulates and may produce either exosmosis or effusion.

Between these two forms of hyperæmia there is a great difference owing to the nature of the accumulated blood. In the first place it is venous blood, fully charged with carbonic acid and the results of tissue waste; in the second case it is arterial, charged with oxygen and free from the results of tissue waste. It is evident, therefore, that there will be great differences in the two cases, in the functional and nutritive activities of the tissue cells, and in the general excitability of the nervous and muscular tissues, from the sedative effect of the carbonic acid on one hand, and the stimulating effect of the oxygen on the other; the clinical conditions will therefore vary from a passive inactivity in the first to a greatly increased activity in the second, on the part of all the structures.

The causes of this increased arterial supply are not all thoroughly understood. It is most probable that there exists in the muscular coat of the arteries, as in the heart, a power of contraction which may give a sharp, quick, forcible character to the jet, so that the local blood-pressure becomes increased without any *great* change in the quantity of blood supplied to the part; the arteries appear to act in an excited, irritable manner. However this may be, it seems quite improbable that the only factor regulating the blood supply to a part should be an active state of vaso-motor nerves causing contraction, or a passive condition allowing dilatation of the arterioles, without there being local causes capable of altering the rate of the circulation and the local blood-pressure, but not sufficiently powerful to effect the system at large.

Serous diarrhœa may therefore be the clinical expression

of either one of several pathological conditions—there may be obstruction to the portal circulation; there may be paresis of vaso-motor nerves from nervous exhaustion, as from loss of sleep; there may be active determination of blood from excessive direct nervous irritation, as from acids and undigested or fermented matters in the *primæ viæ*; there may be active determination of blood from reflex nervous irritation, as in teething; there may be the same result from inflammation of the mucous coat of the intestines; it may also occur in consequence of the pyrexial condition; or it may result from a collateral fluxion on the application of cold to the external surface causing contraction of its arterioles, especially if these happen at the time to be very full of blood, and in addition to these, the nutritive condition of the vessels themselves must be taken into consideration, for if they are in an atonic, attenuated condition from defective nutrition, they will not only be more easily distensible, but they will more readily allow the passage of their more fluid contents.

There are three different series of morbid processes running in parallel lines through the activities of the various structures; these processes have for their point of departure the tissue elements of the structures—the cell element which forms the basis of the structure; the vascular element including the blood and the vessels supplying the structure; and the nerve element entering into its composition; and there are disorders originating in variances in the activities of either one of these elementary parts. The active forms of these disorders are, active hyperæmia, on the part of the vascular element; irritation, on the part of the nervous element, and inflammation, on the part of the cell element. These processes, though bearing at times the greatest resemblance to one another, are essentially different; and nowhere is this difference more strikingly displayed than in

the results of treatment ; a therapeutics which is beneficial and curative in one, may be disastrous in either of the others. The importance of a correct appreciation of the pathological condition is in no disorder more important than in the one we are considering, judging from its excessive fatality.

A toxæmic condition of the blood, the result of breathing impure air, loaded with the result of animal and vegetable decomposition is a very common cause of cholera infantum ; when the depressing influence of the foul air, the great loss of blood serum, and the shock, produce a speedy collapse.

That form of nervous exhaustion, which is produced by the continued fretting of an irritable nervous child, will greatly predispose to an attack of infantile cholera ; and especially so, if it results in loss of sleep, or a failure in the organs of assimilation and digestion.

The action of heat in the production of this complaint is probably complex ; it causes great atmospheric impurity, it deranges the nervous system ; it interferes with the purification of the blood in respiration ; it readily induces unfavorable changes in the substances used as food for the infants ; and by the excessive perspiration it produces, it may interfere with due elimination by causing a scanty condition of the urine.

Repeated slight attacks of active hyperæmia, the result of the physiological action of the intestines, with failure on the part of the stomach to digest the food, may after a while culminate in an attack of cholera infantum, or some less severe form of disorder.

The occurrence of very copious serous discharges may occur, while the sacculi of the colon are filled with fæcal matter ; the serous fluid passing rapidly through the lumen of the intestines without disturbing their contents.

Mucous diarrhœa also may be the result of various patho-

logical conditions; it probably indicates a greater extension in the affection of the tissue elements than exists in serous diarrhœa, implicating not only the vascular element but also the cell element of the mucous membrane.

The extent, to which the various epithelial and glandular cells of the intestinal mucous membrane are under the control of nervous influence, is not yet fully known. That such control is exercised may be taken as granted, both in their nutritive and their functional activities. There would therefore be an increase in the amount of mucus secreted as a result of nervous irritation whether direct, reflex, or systemic.

An increased secretion of colorless mucus is simply an increase of the natural secretion; and results from the soakage of an excessive quantity of intercellular fluid, the result of hyperæmia, through the mucus cells, and this during its passage becomes saturated with the mucin they naturally contain.

Any admixture of mucus with albumino-fibrine increases its consistence, and indicates the existence of inflammatory action; and this may vary from the most evanescent to the most severe degree.

The inflammation may affect principally either the epithelial coating of the mucous membrane, or the small glands which are scattered through it; in the latter condition the mucus will be rather in distinct masses, in the former more generally diffused; when all these structures are affected, by far the most frequent condition, the mucus will be in small detached flakes or shreds.

A tough stringy mucus indicates considerable inflammation in patches with an acid condition of the intestinal contents.

It is important to remember the natural directions of the current passing through the various glandular structures. In Lieberkühn's and Brunner's glands the current is towards

the cavity of the intestine ; in Peyer's glands and over the venous radicles, the current is from the cavity of the intestine.

The epithelial cells may therefore be traversed by currents in both directions, allowing fluid to pass through them into the capillaries, and allowing the intercellular fluids to ooze through them to the surface, thus keeping the structures covered with a protecting mucus.

Fæculent diarrhœa is the simplest form of the complaint, its only importance lies in two facts: first it may be the precursor of the severest form of disorder if not checked ; secondly its continuance will induce anæmia and general debility as well as an atonic condition of the structures involved.

Purulent diarrhœa is quite serious in its indications ; it evidences a low form of hyperplastic irritation, which may rapidly go on to necrosis of small portions of the mucous membrane, and consequent ulceration. When the pus is mixed with blood in small quantities, it indicates that ulceration has taken place.

The existence of small traces of blood in the fæces evidences the excessive degree of the hyperæmia, and generally a high grade of inflammatory action ; in the congestive form of hyperæmia it will indicate the danger of softening and desquamation of the epithelial covering, and probably the occurrence of gangrene.

While, however, the examination of the discharges yields us the most valuable information, it is only one part of the clinical examination—the local condition of the abdomen as ascertained by palpation and percussion, the state of the tongue and of the gums, the condition of the nervous system, the presence or absence of pyrexia, and the state of the other excretions, ought all to be thoroughly investigated ; it is also well to be certain concerning the co-exist-

ence or otherwise of any bronchial complication, or of any tendency to run into dysentery.

The various forms of diarrhœa may be classified as follows :

The congestive (passive).

The hyperæmic (active).

The irritative.

The inflammatory.

The choleraic.

The dysenteric.

While the congestion causing the diarrhœa may arise from an obstruction to the portal circulation before it has entered into the substance of the liver, yet it is generally the result of a hindrance to the flow of blood through the liver itself; in this case there will therefore be found the other symptoms of hepatic congestion, as swelling of the right hypochondrium, with hardness and tenderness on pressure, oftentimes tenderness at the præcordia; gastric derangement, perhaps vomiting; scanty secretion of bile, or a great redundancy, or but little change from the normal condition; urine high colored, often scanty, and frequently some pyrexia, which may assume a periodic type.

Small doses of calomel, .006 gm. (gr. $\frac{1}{10}$), ipecac. .006 to .003 gm. (gr. $\frac{1}{10}$ to $\frac{1}{20}$), and acetate of morphia, .001 to .0006 gm. (gr. $\frac{1}{20}$ to $\frac{1}{100}$) repeated every two or three hours for a few doses, and followed by some sodæ potass. tart., will often relieve this condition in a short time. Vomiting if troublesome may be controlled by bismuth or carbonic acid water. After the diarrhœa has been relieved, alteratives, as nitric acid, iodide of potassium, or bichloride of mercury, with preparations of bark, or the liquor sodæ and liquor potassæ may be employed; and as there often remains some functional derangement of the stomach, bismuth and pepsine at meals, and an alkali containing both potash and soda about

an hour after, may be continued for a short time. The surface should be kept securely protected from being chilled, and the urinary secretion should be carefully attended to. Change of air to a non-malarial section of the country may be necessary.

We have seen that the hyperæmic form may result from either one of several causes. If the attack be slight, the stools fæculent, not varying much from the natural condition, a mild aperient may be administered, such as castor oil, syrup of rhubarb and paregoric, and subsequently some bismuth, with ipecac and opium or morphia acetate. This condition is often the result of too frequent feeding.

If in such a case the stools contain no digested food and have a sour odor, hydrarg. é creta, pulv. rhei and pulv. cinnamomi may be given, or rhubarb and soda in peppermint water; afterwards chalk mixture in some form with bismuth may be used. Lime water should be given with the milk; subsequently, if necessary, the old compound powder of chalk and opium containing the tormentilla, with bismuth, may be given; and to prevent a relapse, it is well to give pepsine and bismuth for a short time.

If the stools contain large quantities of bile (bilious diarrhœa) it will be well to give first the mildest laxatives, with an abundance of some mucilaginous substance to afford the surface of the mucous membrane a protective covering against the acrid bile passing over it; as infusion of slippery elm bark, or chalk mixture with compound tragacanth powder or gum-water. Then hydrarg. c. cret. with ipecac. and sodæ bicarb., followed by ipecac. and opium, and afterwards by an alterative tonic as nitrous or nitro-muriatic acid with syrup, etc., or bark and an alkali, if this can be prepared so that the child will take it readily, to prevent a relapse.

If the stools are frequent, copious, thin and watery, it may

be necessary to attempt the accomplishment of the several indications at the same time; as, to cause the contraction of the capillaries and so prevent the great wasting of the blood serum; to lessen the excitability of the nerves and the muscular coat of the intestines and so check their peristaltic activity; and to prevent any inflammatory action by derivation of blood from the intestinal to some other surface. The acetates of lead and morphia may be administered internally, enemata of starch and laudanum be used after each evacuation; and mild turpentine epithems be applied to the general surface. If necessary the oleum terebinth. may be given alternately with the acetates; it may be readily disguised by peppermint. Such a diarrhœa is often caused by the heat of summer, and it rapidly induces great exhaustion.

If a chronic diarrhœa assumes this form, hydrarg c. creta .01 gm. (gr. $\frac{1}{6}$) every hour may be given, and enemata of starch and laudanum used.

If the diarrhœa is the result of decomposition of the contents of the intestines with absence of bile, marked by clay colored stinking stools, a mixture containing blue mass, henbane, and soda with peppermint may often be of service; or hydrarg c. creta .02 gm. (gr. $\frac{1}{3}$) every hour or two, or hydrarg bichlorid .001 gm. (gr. $\frac{1}{60}$) every hour in water; followed by pepsine and nitric acid in small doses.

If the diarrhœa depends upon nervous exhaustion, or an atonic condition of the intestinal vessels, as manifested by the feeble pulse, cool, pale surface, the absence of pyrexia, etc., stimulants and tonics may be given freely, as camphor acetate of lead and opium, aromatic confection with compound spirits of lavender, sulphuric acid with tincture of cinnamon and opium, rhatany, logwood and aromatics, or the pernitrate of iron. Pepsine may also be given with the food. In such cases ergot has been found useful.

If the discharges are very largely composed of mucus,

turpentine emulsion, or castor oil emulsion with a little turpentine may be first administered; and afterwards bismuth in infusion of chamomile, or acetate of lead with opium, or oxide of zinc with Tully's powder; or some of the vegetable astringents may be employed. In chronic cases sulphate of copper, and creosote are often serviceable.

If the diarrhœa is the result of the irritation of teething, the gums should be freely lanced if the tooth is nearly ready to come through; then sedatives should be administered, as the bromides with henbane, lactucarium, or minute doses of morphia acetate, or of acetum opii, while bismuth may be given as a local sedative. If there is much cerebral irritation, a few doses of calomel .005 gm. (gr. $\frac{1}{12}$), with ipecac. .006 to .003 gm. ($\frac{1}{10}$ to $\frac{1}{20}$ gr.), opium .002 gm. ($\frac{1}{30}$ gr.) may be first given every hour or two for five or ten doses, followed by the sedatives; or bromide of potassium may be combined with bromide of mercury and henbane. The object is to quiet the local focus of irritation, to diminish the excitability of the brain and nerve centres, and to allay the reflected irritation that has been set up at the periphery, in this case the nerves of the intestinal canal.

If the irritation has produced gastric disorder also, with undigested food and the usual results, the treatment must be modified accordingly; while in this as in all other cases of diarrhœa, hepatic complications must be anticipated or removed. In irritative diarrhœa arising from any other local cause there will be the same indications for treatment.

If the stools show the presence of marked inflammatory action, with hot abdomen, increased temperature, rather scanty urine, thirst and general disorder of all the functions, the first point is, to be certain that it is not a case of typhoid fever, for in such a case it is hopeless to expect to remove the disorder in a few days. If not, the treatment may be commenced by giving hydrarg. c. creta, .03 gm. (gr.

$\frac{1}{2}$) or calomel .01 to .006 gm. (gr. $\frac{1}{6}$ to $\frac{1}{10}$), pulv. cret .06 gm. (gr. 1), bismuth .12 gm. (gr. 2), and ipecac. .006 gm. (gr. $\frac{1}{10}$) every half hour (or hour) for a few hours, with some liquor ammon. acetat. in infusion of elm bark or of sassafras pith; occasionally this may be followed by a weak emulsion of castor oil, and subsequently by hydrarg. c. cret. ipecac. and opium. The abdomen should be kept covered by hot fomentations, on the under side of which some spirits of camphor may be sprinkled occasionally. As the inflammation begins to subside, a mild demulcent mixture may be given, as tragacanth with ipecac. morphia acetate, or henbane; citrate of potash, and ammonio-citrate of bismuth in syrup, or the syrup of sassafras pith (Jackson's) may be similarly combined. If an astringent becomes needed, acetate of lead may be used. Later in the case a tonic should be given to restore tone to the intestines. Whenever milk food is given, a little pepsin may be used to promote digestion, to which a drop or two of dilute hydrochloric acid may be occasionally added.

There is a great unnecessary alarm concerning the administration of mercurials to children, and also to adults. It is by no means necessary to give enormous doses to procure their *therapeutic* effects, and their *toxic* effects are not wanted. Calomel in doses of .003 gm. (gr. $\frac{1}{20}$) repeated three times a day for a few days will produce a very visible effect, as evidenced by the character of the discharges. It is the continued small dose of lead that produces paralysis. It would be as sensible to deny the use of any of the dilute acids, because the equivalent of the strong acid would act as a caustic, or of any of the alcoholic beverages, because the contained quantity of alcohol given alone would prove a violent irritant. The therapeutic or medicinal effect of a substance, and its toxic or poisonous effect, must ever be kept carefully distinct before the mind, with the amount required to produce either the one or the other.

The treatment of the choleraic form, the cholera infantum of writers, varies from the most expectant to the most heroic. Calomel in moderate and repeated doses, as from .0125 to .06 gm. (gr. $\frac{1}{4}$ to 1) in a little sugar, placed dry on the tongue will often allay the vomiting, and if it produces free bilious stools, it will generally put a stop to the disease.

Astringents as acetate of lead may in some cases be used freely from the commencement of the attack, either alone, or combined with opium or morphia; or the latter may be used singly.

Stimulants, as the best old French brandy, should be administered freely, but not so freely as to depress the nervous centres, the doses should be small and frequently repeated according to their effects. In some cases the essential oils may be given as in the cholera morbus of adults.

The tendency to collapse should ever be guarded against. As by the frequency of the stools, the serum of the blood first, and subsequently the general intercellular fluid of the body is gradually drained away, the nutritive properties of the blood become lessened, for the intercellular fluid is far more watery and less albuminous than the serum; while its consistence becomes increased, so that at length it ceases to be fit to support life.

The supply of blood serum should be attempted to be sustained, in quantity if not in quality by small and frequent drinks, by enemata of hot water, which may also contain camphor, brandy and opium, and by baths of the temperature of the body or a little warmer, to which some brandy may have been added.

In severe and continued vomiting, *very hot* applications, or *ice* may be applied to the epigastrium; or the hot and cold spinal bags may be applied alternately; morphia alone, or in some cordial, or with hydrocyanic acid, or in iced carbonic acid water or champagne may be used, or it may be

combined with a few drops of sulphuric acid in a cordial, or in water or syrup.

Bismuth will sometimes allay this condition, and sometimes creosote.

Morphia may also be used hypodermically in doses of .0003 gm. (gr. $\frac{1}{2000}$), or upwards according to the age of the child.

While vomiting is a persistent symptom, it is worse than useless to give anything by the mouth except in the very smallest quantities; and if this symptom is not soon relieved, it will be best to give the stomach *entire* rest for a few hours, giving everything by the rectum or by the way of baths.

Choleraic diarrhœa may occur during an attack of ordinary infantile diarrhœa, or it may arise spontaneously. In the former case it will probably have more or less of an inflammatory character; in the latter, more of an exhaustive character.

The treatment must therefore be varied according as the type of the disease is active or otherwise, from being rather antiphlogistic in the one to being stimulating in the latter. When it has been caused by mephitic vapors, by impure air loaded with the gaseous results of putrefaction, or by decomposing food, it will very frequently manifest its toxic origin by its great and rapid tendency to collapse; some forms of antiseptics should therefore enter largely into the treatment. In some cases it may be well to suspend cloths dipped in lime water, and frequently renewed, around in the room, while oxygen or ozone is generated at the same time.

It may be useful occasionally to lay a spiced pad moistened with brandy over the entire surface of the abdomen.

The bills of mortality attest to the extreme fatality of this disorder; the sooner the treatment is commenced the

better, while it should be sufficiently energetic to control, at least the violence of the symptoms; it should therefore vary according to the severity of the case.

When the inflammatory action extends to and severely implicates the large intestines, the diarrhœa more closely resembles dysentery, as shown by the nature of the symptoms and the character of the discharges. In such cases it will be well to depend on moderate doses of calomel, .03 to .12 gm. (gr. $\frac{1}{2}$ to 2), with opium, .003 to .01 or .0125 gm. (gr. $\frac{1}{20}$ to $\frac{1}{8}$ or $\frac{1}{4}$), according to the violence of the symptoms and the age of the child, given every two hours at first, and then gradually increasing the interval to four hours as the case proceeds.

The propriety of giving an evacuant dose of castor oil or of Rochelle salts must depend on the conditions of the case. As a rule, however, it may be omitted, because the calomel will gradually act as an aperient. If needed, it may be given later in the disease, when the stools have lost the dysenteric character.

As soon as the violence of the disorder has been abated, acetate of lead and opium, with or without acetate of quinia, may be given to reduce the frequency of the discharges and to restore tone to the intestines.

It must be remembered that after an attack of this kind the bowels will remain in a weak and delicate condition for quite a time, so that particular care must be taken against a relapse. A short course of bismuth and pepsine, or of the mineral acids with pepsine, will often be of great advantage. Of course any peculiar features in a case must be met by a corresponding peculiarity of treatment.

In all forms of intestinal disorder in infancy or childhood, some general principles are to be observed. Thus the child should be kept at rest and recumbent, not be jostled about; it should lie on a hair pillow or in its cot; it should never be shaken in the arms or on the knee.

The air to be respired by the child should be pure, and the room well ventilated; if possible the child should be taken a short distance into the country.

Any excess of heat should be reduced by sponging with tepid water, a wet compress may be kept on the surface of the abdomen, and be moistened by a sponge if it becomes dry. Antipyretic remedies often form valuable adjuncts to other lines of treatment.

The stomach and intestines should have physiological rest; food should therefore be given only in very small quantities, and it should be of the least stimulating character, and given at distant intervals. Of course the child will lose strength and flesh for a few days, but it will lose more if the bowels are irritated to a greater frequency and amount of the discharges by an improper or excessive diet. Often the cause of the disease at first, this will only tend to prolong its duration and to increase its violence.

As soon as the violence of the disorder has been subdued, and symptoms of weakness begin to be manifested, wine whey and freshly prepared beef-tea made according to Liebig's method may be given more or less freely, according to the requirements of the case; or raw beef may be minced fine, mixed with a small piece of pancreas, some pepsine, and a little dilute hydrochloric acid, and soft water; this may be macerated in a warm place for two or three hours; the fluid then is strongly expressed, and the acid neutralized with some carbonate of soda. This will be more nutritive and less stimulating than ordinary beef-tea. In some cases where the disorder has been chronic, and seems to be perpetuated by general debility and loss of tone in the affected parts, these articles may suffice without the use of any medicines. In such cases it is often useless to give milk, even though much diluted with water. The gastric juice is not secreted properly from the impoverished state

of the blood, the casein is not digested, acts as an irritant, causes still greater waste, and thereby reduces the child much more; while beef-tea needs no digestion, it enters the circulation at once, as does also the wine whey; they become assimilated in their passage through the liver.

The surface must be kept warm and be well protected against a chill; by keeping the skin well supplied with blood, the amount in the intestinal vessels will be lessened.

No matter how slight the attack may be at the commencement, it is liable to assume the most severe form before its termination. The *juvantia et lædentia* cannot therefore be too carefully considered.

The main object of this paper is to lead the profession to a consideration of the various pathological conditions, and the different clinical appearances, which arise and present themselves in individual cases, a due comprehension of which can be our only hope for a rational and successful mode of treatment.

EDITORIAL DEPARTMENT.

LUNACY REFORM.—HISTORICAL CONSIDERATIONS.

At different times within the last one hundred years, Insane Asylums have been the subject of much anxious thought on the part of philanthropic physicians and laymen. This more or less expert study of asylums has usually grown out of a wave of strong popular feeling or prejudice against some points in the management of the insane. Three such periods of suspicion, of public enlightenment, and of consequent improvement in the lot of the insane, may be cited.

1. The assault on the prison plan of asylum, as inaugurated at Bicêtre in 1792. Pinel was the embodiment, the executor of a large movement for human liberty acting in numerous directions. He used this great weapon to strike the manacles from insane patients, and did a great deal to assimilate their condition to that of patients in ordinary hospitals.

2. Charlesworth and Connolly in 1835-40 inaugurated another great reform which has gradually invaded country after country, our own very slowly we regret to say. This was the absolute abolition of all physical restraint upon violent patients, and the substitution of watchful kindness therefor.

3. Within the last ten or fifteen years in Europe, a decided revival of science has appeared in the medical staff of asylums; or perhaps it is better to say that more scientific men and methods have appeared in this specialty. We may cite as examples Dr.

Arndt, Profs. Meynert, Gudden, Westphal and Dr. Hitzig in Germany; Morel, Baillarger, Magnan in France; Crichton Browne, Herbert Major, Mickle in England. These gentlemen, besides administering asylums in a satisfactory way, have made solid contributions to medical science, with respect to the anatomy of the brain, the study of its lesions in insanity, and points in therapeutics.

In America no such movement has appeared, though in one asylum a costly and inefficient attempt at pathological study has been made. I have no hesitation in declaring that not one of the few American contributions to the scientific aspects of insanity has been meritorious, and has been quoted with praise by competent critics. Indeed it is necessary to add that in the various European works on insanity, hardly an American physician's name is cited except that of the celebrated Rush. Besides, no treatise on insanity, and no important monograph upon one of its forms has appeared in this country. The published studies of our alienists almost all relate to medico-legal topics which possess a *practical* (*i. e.*, profitable?) interest which scientific questions do not have

Not only there are no *evidences* of a scientific revival among asylum superintendents, but from conversation with these gentlemen, from reading the Proceedings of their Association, there is a widespread belief in the minds of many who have given attention to the subject, that our alienists are not scientifically trained men; are not versed in the new anatomy of the brain; do not believe in the growing physiological psychology of the present; and that they are consequently incompetent to further the next progress in the treatment in the insane—a progress which is designated by all signs of the times as being in the direction of improved therapeutics based upon pathological anatomy and psychology.

It would thus seem that the present scrutiny and criticism of asylums in this country is a part of a general movement tending to make the organization of hospitals for the insane more similar to that of hospitals for other patients.

The chief points involved in such a reform will be detailed later on, in this and other editorials. Mingled with the professional

criticism of the last few years, there has been a strong popular tide of ill-will and abuse directed against asylums, but on altogether different grounds. The public, even the educated public, would prefer, I suppose, to secure absolute kindness and humanity in asylums, rather than scientific and more successful treatment. This is, it seems to me, a natural feeling, but it is one which we cannot be expected to share. In the first place, we do not have faith in most of the stories told of asylum oppression, cruelty and wrongful imprisonment, because we know the peculiarities of monomaniacs, of patients with delusions of persecution, and the deceptive nature of remissions. In the second place, we believe that in the ordinary sense of the words, humanity and kindness now obtain in our asylums, and that there is no reason for calling in question the personal worth and kindliness of most of our superintendents.

Therefore it is that in the various medical criticisms of New York asylums, the causes of complaint which have proved so interesting to enterprising newspapers are not referred to.

The present movement is, we repeat, aimed at bringing about through public opinion, a more medical and scientific organization of asylums. And to this end we ask all physicians to take up the question and study it from documents, and by frequent visits to the asylums near them.

A complete study of all the questions involved in "Asylum Reform" is impossible in an article like this. I must restrict myself to the consideration of a few topics :

I. DR. WILBUR'S CRITICISM IN 1876.

At the request of Governor Tilden and the N. Y. State Board of Charities, Dr. H. B. Wilbur, Superintendent of the State Asylums for Idiots at Syracuse, made an inspection of a number of British Asylums in the summer of 1875, and his report, chiefly statistical, was published by the Board of Charities in January, 1876. In 1877 Dr. Wilbur republished the pamphlet, with a preface in which he summarily dealt with a quibbling criticism of the report.

In brief, it may be said that Dr. Wilbur visited asylums in Eng-

land, Scotland and Ireland containing nearly 15000 patients ; he took instant notes of what he saw, and made transcripts from the journals of the institutions, he conversed and corresponded with the eminent gentlemen who compose the Boards of Commissioners of Lunacy, and he met with the most cordial reception everywhere. Besides many comments on various matters connected with asylum management, Dr. Wilbur deals chiefly with these subjects :

1. The employment of patients.

In this matter he found the most to praise in British asylums and the most to condemn in our institutions. The report contains tables giving the number of patients employed, and the kind of occupation in numerous asylums on the day of the visit. For example, in the West-Riding Lunatic Asylum on July 26, 1875, out of 708 male patients, 532, or more than 75 per cent. were actually employed ; out of 699 females 485 were busy, or 69 per cent. Yet in 1876 Dr. Gray, by many considered the leading American superintendent, published the statement that not more than 25 per cent. of patients could be employed as six hour workers.

Dr. Gray's position with reference to the employment of the insane is clear enough, though his statistics are not easy to appreciate because he usually reckons the number of days' work done instead of stating the percentage of patients employed.

In his Report for 1876, he says, p. 63 : " I am well satisfied, from long and careful observation, that from twenty-two to twenty-five per cent. would be the highest estimate of six hour workers, who could be depended upon." Again on p. 55 it is stated : " We give them all the work they need."

In the Report for 1877 nothing is said of this important subject except that the amount of labor performed by patients was greater than in the preceding year. The same statistics of day's labor are given.

In the Report for the year 1878 the superintendent writes, p. 22 : " In my Report in 1876 I gave my views fully in regard to this question of occupation, and experience has only tended to confirm these views." In other words, in Dr. Gray's opinion, the

percentage of labor in 1878 should be the same as that for 1876. Let us see if the annexed table bears this out :

UTICA ASYLUM.

| YEAR. | AVERAGE POPULATION. | MALE PATIENTS. NO. OF DAY'S LABOR. |
|-------|---------------------|---------------------------------------|
| 1876 | 615 | 19,911 |
| 1877 | 607 | 26,141 |
| 1878 | 600 | 34,915 |

Thus we see that two years, from 1876 to 1878, including the period when the force of Dr. Wilbur's report was making itself felt, witnessed an enormous increase in the amount of labor done by Dr. Gray's male patients, an increase of 43 per cent ! But as the number of patients was less in 1878 than in 1876 by nearly 3 per cent., the increase in labor approximates 50 per cent. ! And yet in 1876 Dr. Gray tells us that he was obtaining all the labor that ought to be obtained from his insane patients : in 1878 he says that he has not changed his opinion ; yet his tables show that he has nearly doubled this labor ! Was Dr. Gray, in 1876, "after twenty-six years of experience," mistaken as to this question about which he expressed himself so dogmatically, or did he two years later overwork his patients ?

Thus it appears that progress will be made even in the midst of protestations of conservatism. Dr. Wilbur's statements in 1875-6 concerning the excellent system of employment in British Asylums have done thus much good.

In all British asylums Dr. Wilbur found that great diligence was used to occupy patients in work proportionate to their strength, and that all the physicians looked upon occupation as positively useful in diminishing excitement and in preventing *ennui*. In connection with this let me beg any reader of the ARCHIVES to go to an asylum and see for himself the chronic insane and the convalescents who are standing or sitting idle with despair and *ennui* written upon their faces. "Something to do," seems to be the only prescription called for.

2. The removal of physical restraint.

In this matter Dr. Wilbur found that remarkable progress had been made in Scotch and English asylums. In some institutions a system of open doors and gates for the majority of the patients prevailed, and nowhere were cribs, straight-jackets, etc. met with. At the colony of Gheel out of 1,300 patients only four were under restraint, and large numbers enjoyed almost perfect freedom.

At the same time, 1875, that barbarous "crib" was in use I believe in all our asylums, and to-day I think it is still employed in some. It was banished from one large state institution only so late as last autumn. Straps and waiscoats are still freely employed in the best institutions, and when a visitor is shown around an asylum the medical officer carries a large bunch of keys, unlocks and locks innumerable doors, and does it in very much the same way that a keeper of convicts would do. And yet escapes from these well-locked, well-walled asylums are not unknown.

In conclusion, it appears that by comparison there is a remains of last century repression of the insane in our State, while in Great Britain these unfortunates are more humanely treated year by year.

3. The relative frequency of accidental deaths and suicide.

It is admitted that even in the best managed institution a determined suicidal patient may carry out his plan. Still with equally good management there should not be great differences in the proportionate number of such occurrences in two countries. Yet Dr. Wilbur quotes from official reports as follows :

"In looking through the reports for 1874 of twenty British asylums, containing in the aggregate about 15,000 patients, I find that there were but seven accidental deaths, and these nearly all in the case of paralytics and epileptics, and only five suicides.

"In the annual report of the Commissioner of Lunacy of the State of New York for 1875, where are given the statistics of thirteen institutions, containing in the aggregate about 3,500 insane persons, there is found the record of twelve suicides. Other casualties are not noted."

In the first instance the proportion of suicides to inmates is one-thirtieth of one per cent.

In the second instance the proportion is nearly one-third of one per cent.

Thus in well-locked, well-watched New York asylums there were approximately ten times as many suicides as in the British institutions !

And who can tell about the accidental deaths not reported in our asylums ?

4. The inspection of asylums.

As shown by Dr. Wilbur, this necessary supervision seems admirably done in Great Britain by the various Boards of Lunacy. The members of these Boards really inspect, they look searchingly through asylums, using all possible sources of information, and they enter their conclusions truthfully and fearlessly upon a register kept at the asylums for that purpose, and make their judgment public by means of formal reports.

In America the appointment of inspectors or commissioners was formally resisted by the Association of Superintendents as recently as 1876 (see p. 74 of second edition of Dr. Wilbur's pamphlet) ; the resolution being passed by men who knew or ought to have known that government inspection of asylums had long been practiced in all the chief civilized nations with the best results, especially in Great Britain. And when a State Commissioner of Lunacy was appointed in the State of New York, of what advantage was it ? What serious criticisms or reforms followed his perfunctory execution of the high duties of his office ? A single example of what this official termed "inspection" will suffice. I again quote Wilbur (p. 17) : "In his (the Commissioner's) report for 1875 he gave an unqualified indorsement of all the State asylums for the insane. He had visited from time to time the asylum for insane convicts at Auburn, and he commended the management of that directly and by implication. It occurred, however, that the "Prison Commission" of last year (1876) made an investigation of the management of that establishment, and I quote from the testimony in regard to it.

"Dr. McDonald, who was appointed Superintendent in the Spring of 1876, thus testified :

“ ‘I found the institution in a decidedly unsanitary condition ; I think I never saw its equal in that respect, presenting an appearance of squalor and destitution beyond anything I have ever seen in any pauper establishment or poorhouse ; the bath-rooms and water-closets were a stench to the nostrils ; the beds were literally swarming with bugs ; the food was badly cooked and badly served ; three-fourths of the patients were suffering from dyspepsia and bad diet ; the bread was sour, the flour being of an inferior quality ; the cells dingy and dirty ; no provision for extra diet for the sick or feeble was made, except a weak tea ; there were few of the modern remedies used in asylums, about the only one was hydrate of chloral.’ ”

(As to punishments.) “ ‘Punishments were the order of the day when I came here ; I have a patient there to-day who has a pistol ball in his arm that was shot in by my predecessor, and another in the hip ; I found one patient with handcuffs upon his hands fastened behind him ; I am told patients were paddled ; one of my present attendants says he has seen my predecessor black the eye of a patient, and he did not think anything of doing it himself.’ ”

One of the attendants testified to paddling patients ; handcuffing them ; and chaining a man up night and day for about two months.

There were no records, medical or otherwise, kept of the daily life of the patients. And yet the State Commissioner of Lunacy in his various visits saw or learned nothing of all this ! He *commended the management !*

After the exposure by the “ Prison Commission ” ought not the Commissioner of Lunacy to have resigned for very shame at his superficial and nominal performance of duty ? In another country would he not have been summarily removed ?

This specimen of “ inspection ” in our state is amazing, but in connection with this barbarous asylum at Auburn a still more amazing thing occurred. At the very time when the above abuses were being perpetrated the Association of Superintendents held its annual meeting at Auburn, and after inspecting the prison asylum expressed themselves as follows : “ That their visit had been

peculiarly interesting as giving most obvious evidences of good management ;" "that it seems to us to demonstrate conclusively that even the most desperate convict, when bereft of reason, is treated like his fellow-men, only in a hospital specially provided for the purpose, with all the appliances that can contribute to his comfort and restoration." The first sentence is clear and admirably illustrates the keen critical sense and *special knowledge* of the members of the Association ; the second, in view of the facts revealed a few months later, is sickly bosh and bathos.

With this monstrous example of mismanagement, cruelty, and blindness existing in this State in this year 1875, the public are told that a searching inquiry into the management of all our asylums in 1879, as demanded of the Legislature by numerous petitioners is uncalled for, and is insulting to the Superintendents and the Commissioner of Lunacy ! Did these gentlemen *invite* the investigation of Auburn asylum in 1876, or did they protest against it ? Who can tell but that a *searching* investigation to-day would not reveal the existence of numerous evils worth correcting, more or less after the Auburn type ?

I have dwelt at length upon Dr. Wilbur's critical report because it has never been replied to except by personal abuse, and partly because its publication has caused marked progress in one particular, viz., the greater employment of chronic and convalescent insane. That it has had any effect upon the method of asylum inspection is doubtful, but Dr. Wilbur is not to blame for that.

II. THE MORE MEDICAL AND SCIENTIFIC CRITICISMS OF ASYLUMS FOR THE INSANE.

During the years 1878 several papers were read severely condemning the management of asylums, the want of scientific knowledge in superintendents and their assistants, and the utter dearth of valuable contributions to the science of medicine from asylums. These papers were read before the New York Neurological and the New York Medico-Legal Societies, and many members took part in the discussions.

Dr. E. C. Spitzka's contributions were the most important and the most acutely critical.*

These essays and discussions have remained without reply, except the worn-out remarks that the attacks were personal, were made with a selfish aim in view, were insulting to the superintendents, were made by "outsiders," or by men who could not know anything of insanity, etc., etc.

On a subsequent occasion reference may be made to the peculiar methods of "reply" employed by the asylum ring, embracing personal abuse, scornful but unsupported denials, warnings, and even threats of professional ruin to critics, etc. We have the documents for this accessory question, but postpone its presentation, we hope indefinitely.

III. THE PETITION OF THE NEUROLOGICAL SOCIETY TO THE LEGISLATURE IN 1879.

Out of the numerous discussions upon the pathology and treatment of various forms of insanity and upon asylum management in the New York Neurological Society, there grew up a demand for a formal investigation of asylums in our State. The only way in which this could be done was through a committee of the Legislature. Accordingly, at a meeting of the Society, held April 1, 1878, the following committee were appointed to draw up a form of petition to the Legislature embodying the chief points of complaint: Drs. T. A. McBride, (chairman), E. C. Harwood, E. C. Seguin, E. C. Spitzka, J. G. Kiernan, and Landon C. Gray. On October 7th, the committee presented their report in the shape of the following petition, which, after due consideration section by section, with a few alterations, was accepted by the society, printed, and returned to the committee for the purpose of soliciting signatures. The committee was given power to elect additional members, and Drs. Hammond and Wm. J. Morton, were so added.

* 1. Reform in the Scientific Study of Psychiatry. *Journal of Nervous and Mental Diseases*, April, 1878, p. 201.

2. Merits and Motives of the Movement for Asylum Reform. *Ibid.* Oct., 1878, p. 694.

3. Real Asylum Abuses. Read before the N. Y. Medico-Legal Society, March, 1878. (Not published.)

The following is the petition, which, in March 1879, was presented to the Legislature, supported by a large number of signatures, many of them by professional men of high standing and great influence :

To the Legislature of the State of New York. The petition of the undersigned Physicians, Lawyers and other Citizens of the State of New York, represents as follows :

There has lately sprung up a general and marked discontent in the public mind with regard to the management of our insane asylums. From the nature of the case, the internal mechanism of these institutions being more or less secluded from public scrutiny, it was not to be expected that the popular feeling could point to any special fault in the system as its cause. Like most popular movements, the agitation of the asylum question has, until quite recently, rested on isolated and flagrant instances of abuse, rather than on the great systemic defects of which these instances were but the outcome.

But within the past few years, members of the medical profession, whose studies led them to investigate asylums, without bias or prejudice, purely in the interests of medical psychology and philanthropy, have made public charges against the system of asylum supervision and asylum management in this State which are deserving of notice.

They merit special attention for the single reason, if there were no other reasons, that those now at the head of our asylums, have been either unable or unwilling to answer their arguments, or to disprove their allegations.

Many of these defects, medical and administrative, have been admirably and fully set forth by Dr. H. B. Wilbur in his "Report on the Management of the Insane in Great Britain," published in 1876 and 1877. This writer institutes a comparison between the management of the insane in the two countries which is as humiliating as it is instructive.

The following points are among the most prominent features of the pending inquiry. Some of them rest upon exact evidence, others can be substantiated by responsible members of the medical profession, and regarding still others, strong circumstantial evidence can be adduced. It is the purpose of the projected investigation to discern how many of the questions herein set forth can be satis-

factorily answered under oath. We also believe that the points referred to by these queries are of the highest importance for the welfare of the unfortunate insane.

QUESTIONS RELATING TO THE MANAGEMENT OF ASYLUMS.

1. How many days in the year is the Superintendent actually and really on duty in his office or in the wards ?

2. How many days in the year is the Superintendent away from his asylum engaged in private business, in medical or medico-legal consultations, attending upon courts without an order from the Attorney-General or other proper authority ?

3. Does not the State (or city), in giving the Superintendent a fair or large salary, make a contract for the use of his whole time, usual vacation excepted ?

4. How often in a week does the Superintendent see and speak to *every* patient under his charge ?

5. How many patients in the asylum are seen only once a month, or less often, by the Superintendent ?

6. How frequently does the Superintendent make unexpected visits to his wards ? How often does he make tours between midnight and morning, to observe the symptoms of some patients, and to see how nurses and watchmen perform their duties ?

7. How many patients are actually and really under the Superintendent's own medical treatment ?

8. Does the Superintendent see and examine every new case immediately after admission ; and is he responsible for the registered diagnosis, and general treatment ?

9. Does the asylum possess, and do its medical officers really use such common instruments as the thermometer, ophthalmoscope, æsthesiometer, dynamometer, sphygmograph, microscope, faradic and galvanic electrical batteries, the speculum, and uterine sound, chemicals for the analysis of the urine, etc. ?

10. Is feeding by force *always* done by a medical officer or in his presence, as it should be ?

11. Is the Superintendent consulted whenever forcible restraint is required ; and is the duration, manner and result of this mechanical restraint duly recorded in a book kept for the inspection of the Commissioner of Lunacy and of the courts ?

12. How frequently does the Superintendent avail himself, for the benefit of his patients, of consultations with general physicians and surgeons, and gentlemen eminent in the several departments of medicine ?

13. Do you ever employ the barbarous and injurious means of restraint known as a "crib?"

14. Are undergraduates in medicine ever employed in your asylum as assistant physicians, or acting assistant physicians?

QUESTIONS REFERRING TO THE INSPECTION OF ASYLUMS.

1. Does the Commissioner of Lunacy give any notice of his coming to the officials of an asylum he is about to inspect?

2. Has the Commissioner ever visited asylums at unusual hours, as in the middle of the night or in the very early morning, in order to determine the usual condition of their wards?

3. Does the Commissioner ever go about an institution without company, or at any rate without a medical or other officer whose presence can prevent free speaking on the part of attendants and patients?

4. How frequently are inspections made in the various asylums; and how many days in the year is the Commissioner in Lunacy engaged in private business not legitimately appertaining to his office?

5. Does not the State, in paying the Commissioner a fair salary, make a contract for his whole time, customary vacation excepted?

6. Was the present Commissioner appointed in strict accordance with the law which requires the candidate for this position to have been a "physician of experience?"

Besides, your petitioners believe the following statements to be well founded. They refer to more strictly medical matters than the above recited questions, yet we consider that if these evils exist, the State and the patients in our asylums are highly interested in their eradication.

1. Superintendents of insane asylums are, nearly without exception, not chosen from among medical men who have pursued special studies in neurology at home and abroad, and who are well-trained physicians, but from among assistant physicians of asylums who, after having been badly chosen (*vide infra*), have passed a number of years immured in an institution.

2. Assistant physicians of asylums (future candidates for the position of superintendent) are nearly always men just issued from our too elementary medical schools; men who have not served in civil hospitals (which can be entered only by severe competitive

examination); their qualifications are not submitted to any test; when in the institution they are not furnished with means of study (medical journals, books and instruments); and, inevitably, as years go by, they forget what general medicine they knew on graduating.

3. Assistant physicians, moreover, are overworked, and wretchedly paid. Their time is taken up by visiting too many patients, by writing interminable, useless histories of cases, and by various "official" duties, such as talking by the hour with friends of patients, receiving visitors, etc. The largest asylum under State management (in this State) has only four assistant physicians for between six and seven hundred patients. In a general hospital, like Bellevue or the New York Hospital, every division of from forty to eighty patients is officered by one attending physician (who really sees his patients daily) and three assistants, all graduates, selected from among a crowd of the best men by a severe competitive examination. And it must be borne in mind that in general hospitals there are, as in insane asylums, very many chronic cases requiring a minimum of care. From this comparative statement it is at once evident that in spite of enormous outlays of money our insane asylums are indifferently officered.

4. Superintendents and their assistants, with hardly an exception, are not versed in the new anatomy and physiology of the nervous system, the part chiefly concerned in insanity.

5. Superintendents and their assistants, with hardly an exception, are not believed to be skilled in the modern methods of diagnosis and of post-mortem examination. Few of them are able to read in the original the invaluable contributions to insanity and its treatment which we owe to German and French scientific physicians for the insane.

6. The little pathological work which has been done in our asylums at enormous cost has been of the most elementary sort, and has been ridiculed at home and abroad. With the liberal aid it receives from the State, the pathological laboratory in one of our asylums did not furnish the materials for successful competition for the great Tuke prize, for the best essay on the pathological anatomy of insanity, offered in England last year.

7. In some of our asylums the pernicious practice of allowing undergraduates, accepted without *bona fide* examination, to act as assistant physicians, is tolerated. This is highly unjust to the patients, who have a right to medical attendance in the legal sense, and also to practitioners outside. The lunacy laws of 1874 pro-

vide that no practitioner can certify to the lunacy of a patient unless he have been three years in the practice of his profession ; and it thus happens that this experienced physician's diagnosis and certificate are in a measure subjected to the revision and control of men who have not yet obtained their degree, or of others who have just passed from the benches of the medical school to the asylum.

In view of the above numerous reasons for believing that there exists gross mismanagement in the medical administration of insane asylums in this State, your petitioners respectfully request that your honorable body appoint a committee for the examination of the management of all institutions, for the care of the insane of the State of New York.

And your petitioners will always pray, etc.

The way in which the petition was received, the farcial manner in which the committee conducted an "investigation," and the triumphant manner in which New York State asylums for the insane were pronounced perfect, will be related in the next numbers of the ARCHIVES.

In subsequent numbers there will also appear other critical articles studying in detail certain points in the petition. Personalities will be carefully excluded from these columns, but the numerous faults of omission and of commission in asylums must be unsparingly exposed.

E. C. SEGUIN. M.D.

NEW BOOKS AND INSTRUMENTS.

Transactions of the American Gynecological Society.

Vol. III, 1878. Boston ; Houghton, Osgood & Co. pp. 472. 1879.

In its new and most tasteful attire, the present volume is very attractive, and we are far from being disappointed as we peruse its pages. The Society is certainly to be congratulated upon the good work of its Publishing Committee which could hardly be improved, except in regard to the time of its completion. We are well aware of the difficulties which are present in issuing such a volume, and know that the duties of the Secretary are most arduous. Yet the usefulness of the Society is greatly diminished by this delay. The profession at large looks to it for the most advanced theories and practices in gynecology and obstetrics, and are naturally anxious to gather, from the pages of its Transactions, material which can at once be utilized by them before it has become old or been cast aside for something more improved. It is to be hoped that this may be rectified in the future ; for, as it is now, we hardly receive the Transactions of one year before we are on the eve of the meeting for the next one. The book opens with the annual address of the president, Dr. Goodell, the subject of which he makes the relation of neurasthenia to diseases of the womb. It is like what we always expected from the author, interesting, practical, and highly instructive. Having defined the subject and pictured an illustrative case, he refers to a method of treatment which he learned from Dr. S. Weir Mitchell, consisting of rest, massage, electricity, seclusion, and feeding. The details of three cases are then given, and the reasons ascribed for the different parts of the treatment. It is gratifying to see the very conservative manner in which the attention of the Society

was called to this very important subject, where the methods of existing treatment are too apt to be exclusively constitutional or local, and an entire disregard for the relations of the one to the other manifested.

We are very glad that Dr. Sims has put on record the results of his larger experience in an article entitled, *The Surgical Treatment of Stenosis of the Cervix Uteri*, from which we should judge he considered it necessary to use greater care after the operation than when he published his book on uterine surgery, yet still that the operation is safer than the use of sponge or laminaria tents. His condemnation of "machine surgery" in the operation, as he calls the use of the several forms of uterotomes with concealed blades, is most just. They are wholly out of place in performing this operation.

With the care which he takes in each individual case to decide whether the bi-lateral or antero-posterior incision is to be made, we are sorry he does not consider the pathological conditions present which demand operative interference, or which would make such measures objectionable and even dangerous; for upon this, we feel sure, must rest the future of this operation.

In the discussion which followed the reading of the paper, this subject was considered, and Dr. Emmet referred to the changes due to cellular inflammation as interfering with the general uterine circulation. If the time occupied in this discussion could have been more free from personal experiences and have been devoted to the pathological changes which occasion the stenoses, the appropriate treatment would have been more clear to all, and the Society, as such, have been able possibly to give expression to some decided views on the subject, which would certainly have great weight.

It is always a pleasure to study an article like the one contributed by Dr. Emmet on the necessity for early delivery, as demonstrated by the analysis of one hundred and sixty-one cases of vesico-vaginal fistula. Like all his writing, it is most instructive. The great care evident in the preparation of the tabulated cases is quite characteristic, showing that the author considers no amount of labor too great to give to the thorough and complete presentation of his subject. His reasoning and conclusions are excellent, and supported by the statistics of the large number of cases reported, seem to have left no ground for dissension.

Dr. W. L. Richardson's contribution on the treatment of acute parenchymatous nephritis of pregnancy is valuable. From his re-

port of the cases, he shows the importance of examining the urine of all pregnant women, even though no unfavorable symptoms appear. If such examination indicate the presence of any renal disease, the urine of the patient should be daily measured. If this amount fall markedly below the normal, an attempt should be made to restore the function of the kidneys and increase the action of the other excretory organs. Should the amount of the urine still continue very small, and constantly diminished, premature labor should at once be induced. The occurrence of an attack of eclampsia, which is sure to come whenever the daily urinary secretion falls below a certain amount, may thus be avoided. Dr. Richardson's paper shows an amount of original work which is very creditable, in a direction the importance of which will be realized by all.

In the paper by Dr. Busey on Alternating Anterior and Posterior Versions of the Uterus, which is really the report of a case in his practice, we fail to see anything of especial interest to the profession. The Society wisely occupied no time with its discussion.

Dr. H. J. Garrigues is quite interesting in his Remarks on Gastro-Elytrotomy; and in his supplement he considers the relations of the ureters to the pelvic viscera, a careful description of which we do not remember having seen before, and a thorough knowledge of which is so desirable in performing this operation.

Dr. Albert H. Smith, in an article on The Pendulum Leverage of the Obstetric Forceps, shows himself to be a strong advocate of direct traction, and condemns in the warmest terms the pendulum movement. His arguments are exceedingly forcible and his conclusions well drawn.

We are glad that a subject of so great importance as The Treatment of Pelvic Indurations and Adhesions was brought before the Society in a paper by Dr. Van de Warker. It has many valuable suggestions, among which may be mentioned the use of Galvanism and Massage for producing a resorption of the exudation, and the swinging motion of the hammock for the relief of pain.

He acknowledges the great care which must be taken in the treatment, from the fact that a relapse may be induced from very slight local interference. The author thinks highly of chloride of ammonium taken in small doses often through the day as influencing the process of resorption. For a subject of so much importance, it is considered far too briefly by the writer.

The only paper considered worthy of acceptance by the Society at its last meeting appears to have been one on The Mechanism

of Retroversion and Prolapsus of the Uterus Considered in Relation to the Simple Lacerations of the Cervix Uteri and their Treatment by Bloody Operations, by Dr. Nathan Bozeman. The writer seems to lack clinical familiarity with cases of laceration of the cervix uteri, and his reasoning is more theoretical than practical. The term "Bloody Operations" is most ill-chosen, conveying the idea of magnitude which is known to very few operations in this department of surgery.

We should feel exceedingly dissatisfied with our work if, after "seven years" of application, we should introduce such a vaginal support as the author describes. We have carefully examined the pessary, and fail to see anything in it to recommend, but on the contrary, much to condemn.

Other articles are contributed by Drs. White, Johnson, Wilson, Penrose, Byford, Campbell, Parvin, Taylor, and Jackson, of more or less interest. On the whole, the papers contained in the present volume, with a few exceptions, do not reach the high standard established by those of its predecessors.

Biographical sketches are given of the late President of the Society, Dr. E. R. Peaslee; also of its late Vice President, Dr. W. Atlee; and the value of the volume is exceedingly enhanced by the complete biography of gynecological and obstetric literature for the year with which it closes.

The discussions following the presentation of the papers illustrate one great failing of the Society, viz: the very undecided manner in which the subject of each paper is left. The opinion of one, two, or more, having been given, the discussion is closed by the author if he be present. It must be impossible even for the members of the Society to know what is the opinion of its body; and if this be the case with its members, what decision is the general practitioner to arrive at from the reading of its report? If want of time be pleaded as excuse, we should most certainly say that half the amount of work had better be well done, than the whole attempted and left half finished. Particularly is this true when so great diversities of opinion exist, rendering it all the more necessary that the Society, after most careful consideration of the important subjects brought before its meetings, should at least try to arrive at some definitely expressed decision. In this way alone can it reach the sphere of its greatest usefulness, and the valuable work of its members be best applied in establishing the opinions and practices of the profession at large. [W. H. B.]

Manual of the Principles and Practice of Operative Surgery. By STEPHEN SMITH, A. M., M. D. 12mo, pp. 686. The Riverside Press, Cambridge, 1879.

This work naturally follows that on operative surgery, written by the same author in 1862. It is designed for surgeons in civil life, and aims to give a clear and concise exposition of the details of every established operation in surgery, excepting those on the organs of special sense. The scope of the book embraces more than this, in that with each operation is given a full reference to the anatomy, diagnosis, indications and after-treatment, and thus by a logical plan make the treatment of each subject complete and comprehensive. The details of methods are ample, the illustrations sufficient to render the text clear, and by its arrangement all parts of the book are easily accessible.

The book is divided into eleven sections devoted respectively to principles, injuries and diseases of, and general and special operations on the osseous system, the muscular system, the nervous system, the tegumentary system, the digestive organs, the respiratory organs, the urinary organs, the generative organs (male and female) and the extremities including deformities and appliances.

Apropos to the operation, the book opens with a clear and comprehensive consideration of the civil obligations of the operator. What amount of vexation and loss would often be avoided should the practitioner thus at the outset of his surgical undertakings measure the extent of his individual responsibilities! Embraced also among the principles are subjects belonging to minor surgery, examination and preparation of the patient, repair and cicatrization.

The whole work represents operative surgery in all its development to the present time. Every authoritative source is drawn from, and the writer from his own judgment and long experience selects such procedures, to which he should give the greatest prominence. The volume is creditable to author and publisher alike, and we have no doubt it will be appreciated by the profession.

[J. V. D.]

Diseases of the Throat and Nasal Passages. By J. SOLIS COHEN, M.D. 8vo, pp. 742. 2d edition. New York. William Wood & Co., 1879.

This much enlarged edition of Dr. Cohen's work is a systematic treatise on the diseases—primary and secondary—which affect the throat and nasal passages. It is divided into seventeen

chapters, devoted respectively to : diseases of the throat in general, examination of the throat and nasal passages, sore throat, syphilitic sore throat, diphtheria, chronic sore throat, special affections of the soft palate and uvula, special affection of the tonsils, special affections of the pharynx, special affections of the œsophagus, affections of the nasal passages, affections of the septum narium, affections of the frontal sinus, affections of the larynx and trachea, surgical operations upon the larynx and trachea, affections of the laryngo-pharyngeal and of the glosso-epiglottic sinuses, external affections of the neck and throat.

In these chapters are found the anatomy and physiology of the parts concerned, description of instruments in use for examination and treatment, and more or less complete consideration of every affection of the larynx, pharynx and nose. The last chapter, on external affections of the neck and throat, including mumps, goitre, etc., by so much at least, extends the limits of the work far beyond those commonly assigned to such a treatise.

The special points to which we care to call attention relate to diphtheria and the treatment of tuberculous laryngitis. A logical definition of diphtheria is not attempted. Here too a noteworthy feature is the author's advocacy of the doctrine of the non-identity of croup and diphtheria. His conclusions are based on clinical evidence, and he makes prominent in tabular form the opposite clinical phenomena of the two diseases. The other point brought prominently to our attention is the treatment of tuberculous laryngitis, as described in Chapter XIV. Our own teaching and experience have been directly opposite to those of the author, and condemn the use of irritants of every character. Here we are taught that "nitrate of silver is a good local remedy;" that a "saturated solution of tannin in glycerine or ether may be applied by a sponge, etc.," and "powdered tannin may be propelled on the parts from an insufflator, or less directly applied by a sponge." The true doctrine just now is, that tubercular laryngitis is incurable, and the object of local treatment is to *allay* irritation.

At this time, when medical discovery is so rapid and frequent, and the record of it so extensive, time becomes important to the student and reader, and when one meets with a book of these proportions on a subject whose anatomical limits are so little extended we may readily ask whether or no the much might not have been condensed into a little, and at the same time the whole truth be told. We confess that the book before us, while praiseworthy in most respects, is faulty in this. It cannot be more than

a book of reference. As such it should be scientific, and therefore free from all else than that which pertains to the object in view. This volume is too large, because of its unnecessarily great number of words, and the admission into its pages of much that is purely irrelevant. A good example of this may be found at page 19. Here and elsewhere our energy is occupied with that which with for greater propriety might be used to embellish and add interest to a lecture.

And yet the book is a valuable one. Its facts and conclusions come from a large experience, and we heartily recommend it to those interested in this branch of medical study. [J. V. D.]

Physiology and Histology of the Cerebral Convulsions, also Poisons of the Intellect. By CHARLES RICHET, A.M., M.D., Ph.D. Translated by EDWARD P. FOWLER, M.D, New York, 1879, Wm. Wood & Co., pp. 170.

Under the above, on first sight rather startling title, two essays written each for a different class of readers, are presented to the American medical public in one volume. The first essay, on the Physiology and Histology of the Cerebral Convulsions, discusses the latest discoveries in these fields; its descriptions and arguments (however faulty some of them may be) are in the ordinary language of medical science, and intended for the professional reader.

The second essay, on the Poisons of the Intellect, was intended for the lay public. A few of the choicer extracts may serve to illustrate its general character, and with this we shall dispose of it. P. 159. "Recently a new substance, chloral, has been introduced into therapeutics, which resembles chloroform in its chemical constitution and in some of its physiological properties." P. 155. "The dessicated juice of the poppy, called opium, and its tincture, laudanum, have similar properties." P. 169. "Opium is a dangerous poison, not only from the fatal effects of an overdose, but because its use is apt to lead to the opium habit. In China this is a national vice; and the opium shops * * * correspond to the *cabarets* and taverns of more civilized lands."

All this may be very well in its place, addressed to the average layman; but what can have possessed Dr. Richet to suggest the addition of this highly commonplace and superficial essay to the other essay, as his translator states him to have done in the preface?

True, European writers, if judging the American medical pro-

fession by certain translators of their works as samples of the same, may come to form a very unfavorable opinion of their Cis-Atlantic colleagues, and our profession has as a result received perhaps an undue share of rather primitive works in a translated form, but no one has yet attempted to rate us so low that we should require for our enlightenment a popular treatise of twenty-five pages on alcohol, chloroform, hashisch and coffee! We have seen articles far superior to this one of Dr. Richet's in our popular magazines!

The first part of the book deals in Part I with the structure of the convolutions, following in the main Meynert, Mierzejewski and Lewis. The illustrations are mostly taken at second-hand from Charcot, two "plates" by the author on the cornu ammonis are crude in the highest degree, and it may serve to characterize the author's peculiar views as to what is and what is not essential, that he has intentionally omitted the fimbria of the *real* white matter of the cornu ammonis in these drawings.

Another figure illustrating a nerve cell of the cortex (after Luys) is so fearfully and wonderfully made that a friend of the reviewer's recognized it as the entire nervous system of the aplysia as given by Carpenter. The text is full of inaccuracies. Meynert is stated (p. 3) to be the first who gave a clear description of the cortex, though this author himself gives the credit to Arndt and Lockhart Clarke. The staff of the Lunatic Asylum of London is credited with the work of the West Riding Asylum of Yorkshire. Meynert is stated to make five cortical types in one place and three in another.

Dr. Richet commits himself unreservedly to the view of Charcot that "where there are motor centres there are large cells; this is true of the *cerebral cortex as well as of the spinal axis*." Now, the oculomotor nucleus contains very small cells, and the auditory nucleus and ganglion geniculatum very large cells. A knowledge of this fact should prevent such hasty generalizations. The second part contains some physiological deductions, some of which are very ably put, but on the whole this portion of the work is a repetition of the discussion and cases already familiar to American readers through Ferrier's last work.

A thorough criticism is out of the question as Dr. Fowler has taken the liberty to abridge the work.

This leads us to the consideration of the translation as a translation.

Not six months ago Dr. Fowler presented the profession of this

country with a translation from another French author: Charcot's Localization in Cerebral Disease. In this translation Dr. Fowler had managed to introduce a subjacent *white* cortex, subjacent *white* ganglia, three pillars of the fornix, to turn the head of the corpus striatum to the occipital lobe, reversing its *usual* position, and to make a number of similar revelations of so startling a character that we began to doubt profoundly that Dr. Fowler could have any adequate knowledge of the language of the original, or of the rudimentary anatomy of the organ a descriptive work on which he had the presumption to translate.

We accordingly submitted this last specimen of his translating skill to a narrow scrutiny, and lo! (p. 36): "In the *white* substance of the convolutions there exist also *nerve-cells* which have been described by Mierzejewski, and previously by Meynert. These *cells* are small, from 0,007 mm. to 0,010 mm., and multipolar; their poles are very long; they probably are cylinder-axes. Of the nature of these elements, Mierzejewski is yet uncertain. *They are confined to the gray substance* with which they ought to be classed." Is this not a deliciously logical fragment?

On page 130 he speaks of a "castor's" brain, evidently not aware that this word means beaver, and he characterizes a certain monkey as "striped," another as "stripid," in attempting to define the species. "Stripid" and "striped" are about as valuable zoological characteristics as "ringtailed."

Dr. Fowler also appears as a literary reformer. He yokes the ox and ass together in "lobule Hippocampi," layer Ammonis," "type Hippocampi (pages 21, 25), and reverses axis-cylinders into cylinder-axes, an incalculable improvement!

In his translation of Charcot Dr. Fowler boldly rendered the claustrum (*avant-mur*, Vormauer) as little white unnamed bands, although they are not bands, not unnamed, not white and not little. Taught by a dire experience, he in his second effort skillfully avoids compromising himself by avoiding all attempts not only of elucidating, but even of translating, and gives the French original *avant-mur* in italics some score of times. Where the original contained the Latin equivalent, Dr. Fowler has it claustrum, and there is no doubt whatever that to this day he has not yet learned that the two terms are equivalent.

One might be disposed here to adopt the facetious vein, if the question of translations from foreign authors had not its very serious aspects. There may not be much harm done when a mediocre work like the one before us passes through the ordeal

of a bad translation, but when a Charcot gives his sanction to similar work, he not only indirectly underrates our scientific standard, but compromises himself in so far as a superficial and incompetent translator may have it in his power, as in the case referred to, to make a Charcot himself appear as a blunderer in regard to some of the most primitive facts. [E. C. Sp.]

ABSTRACTS AND SUMMARIES.

RECENT CONTRIBUTIONS TO CLIMATOLOGY.

1. THE PAST WINTER IN DAVOS. By CLIFFORD ALLBUTT, M.D., *Lancet*, July 19 and 26, 1879.

2. REMARKS ON THE CLIMATE OF DAVOS. By ARTHUR HILL HASSALL, M.D., *Lancet*, August 2, 1879.

3. CASES OF PHTHISIS TREATED AT HIGH ALTITUDES. By C. THEODORE WILLIAMS, M.D., F.R.C.P., *Lancet*, August 16, 1879.

4. DISCUSSION ON THE INFLUENCE OF MOUNTAIN AIR IN THE TREATMENT OF PHTHISIS IN SECTION ON MEDICINE OF BRITISH MEDICAL ASSOCIATION, *British Medical Journal*, August 23, 1879.

5. THE ADIRONDACK REGION AS A THERAPEUTICAL AGENT IN THE TREATMENT OF PULMONARY PHTHISIS. (Read before the Medical Society of the State of New York.) By ALFRED L. LOOMIS, M.D., *Medical Record*, April 26, and May 3, 1879.

The past Winter in Davos. By CLIFFORD ALLBUTT, M.D., *Lancet*, July 19 and 26, 1879.

Dr. Clifford Allbutt has been foremost among English physicians in bringing forward the advantages of high altitudes in the climatic treatment of pulmonary phthisis, and in calling attention to Davos as a health resort. The paper in the *Lancet* for July 19th and 26th is supplementary to contributions made by him on the same subject in the *Lancet*, October 20 and 27, 1877, and June 8, 1878, and in order to appreciate the article in the *Lancet*,

July 19th and 26th it is necessary to review the previous communications. Dr. Allbutt believes that in most cases of pulmonary phthisis the pathological appearances and conditions are the same as are present in unhealed ulcers and in cold abscesses, and that although there is such a thing as tubercle, it is absent in many cases, or is a secondary product: "that the primary lesion generates blood poison, and this blood poison is found to set up adenoid and septic poisoning;" and that "the treatment must be, putting it briefly, antiseptic." We cannot cut down upon the abscess, and cannot treat the ulcers locally. Antiseptic inhalations cannot be used constantly, and we cannot be sure that they reach the affected part. In default of success, then with inhalations and respirators he asks can we put the patient into a permanently aseptic atmosphere? This atmosphere, he thinks, exists at Davos. Infusions carried to a height of 5,000 feet remain positively unchanged for weeks unless purposely infected. Meat hung up at Davos does not putrefy, and is thus dried and kept for use. "Nor do the lungs rot in the living man. Catarrhs and pneumonias are common enough, but the morbid secretions do not foul, and phthisis is therefore unknown."

Davos is in the valley of the Grisons, 5,150 feet above sea level. The valley stretches from N. N. W. to S. S. E., and is sheltered on all sides except to the S. E. Snow falls at the end of October, and the ground is deeply covered until March. The air is remarkably still and dry, and the solar thermometer often stands quite as high at midday in winter as in summer, and many days in mid-winter may be passed in the open air; and temperatures of -7° to -10° C. are easily borne. Mists are rarely or ever seen. It is this comparative dryness and stillness of the air which makes the cold so easy to bear. The changes of temperature from heat to cold at sundown are very considerable, but the changes in winter are less than in summer, and more gradual. The solar radiation does not raise the temperature of the atmosphere, as the thermometer in the shade may be below the freezing point, while in the sun it is 54.4° C., and the snow does not consequently melt. In the sunshine patients may bask for hours as long as there is no wind, and knowing the decided fall which occurs at sundown, be prepared for the change. The bad season is in the spring, April and part of May. The thaw at this time and the stirring of the air gives rise to "influenza colds" and to other catarrhs, which in winter are almost unknown. No lung lesion among the inhabitant has ever been known to pass into the degenerative or

phthisical stage. All wounds, moreover, heal quickly in this atmosphere. The resident physicians, Drs. Unger and Rüdi, and physicians acquainted with the climate of Davos, state that recovery may almost certainly be promised to patients in the first and second stages of phthisis, with infiltrations and cavities, but with a fair margin of sound lung and bodily strength. One of the first changes observed is the disappearance of the fever, and it almost always subsides in from three to ten days, and while present is far more amenable to apyretic treatment. Those who do best come with catarrh of the apices, infiltration, stationary cavities and hæmoptysis. Theoretically high altitudes should favor hæmoptysis. But Drs. Unger and Rüdi deny this, and state that hæmorrhagic oozings cease at once at Davos, and such cases make excellent recoveries. Phthisis complicated, with nervous affections; hypochondrias, primary neuralgias and the like do not do well. Contrary to Dr. Allbutt's expectation, bronchitis, both acute and chronic, are much benefitted. The offensive expectoration of chronic bronchitis quickly disappears. Senile bronchitis, however, or bronchitis with weak or injured hearts, and Bright's disease are not benefitted. Emphysema does not improve, and the symptoms are as a rule much aggravated, likewise asthma, unless dependent chiefly upon bronchial irritation. Heart diseases do badly. Pleurises improve, and chronic effusions quickly disappear. Excellent results are obtained in cases of anæmia and malaria. Rheumatic affections do better elsewhere. As a rule it may be said that convalescents from most diseases are benefitted by a sojourn here. It is recommended that the patient should not arrive at Davos later than October, and should leave for a few weeks in the spring.

Dr. Allbutt regards winter as the season of the year when the greatest benefit will be obtained at Davos. Two winters and one summer make up the period which it is desirable a case of phthisis of any severity should pass at Davos. Dr. Allbutt would explain the improvement of the cases of phthisis on the theory, as has been alluded to, of an antiseptic or aseptic atmosphere which is present at Davos and other high altitudes, and he says: "The aseptic state of the air at alpine heights has been proved by Prof. Tyndall's experiments at Bel Alp, but Bel Alp, in common with most other Alpine resorts, is insufficiently sheltered. In Davos alone, so far as we yet know, is found an air at once aseptic, bracing and still."

In the *Lancet*, July 19 and 26, 1879, Dr. Allbutt reports some

sixty-six cases, fifty-five of which were cases of phthisis in some form or other. Of these thirty-seven did well. Some recovered entirely; others made great progress, and are likely to recover in another season. The cases which are not likely to be benefited are those with strong hereditary tendencies, with red tongues and irritable stomachs, with occasional attacks of diarrhœa, rapid emaciation, excited circulation, sharp evening fevers and with perhaps neurotic complications, and these do badly even when the pulmonary signs are limited. Laryngeal phthisis he likewise believes does not do well.

Remarks on the Climate of Davos. By ARTHUR HILL HASSALL, M.D. *Lancet*, Aug. 2, 1879.

This communication is of the nature of a personal criticism, and embodies an individual experience, and furnishes no data of importance.

Cases of Phthisis Treated at High Altitudes. By C. THEODORE WILLIAMS, M.D., F.R.C.P. *Lancet*, August 9 and 16, 1879.

Dr. Williams writes that Davos as well as the Engadine stations, which only differ from it in not being so well sheltered from cold winds, has a winter climate characterized by a still cold, dry, rarefied atmosphere, easily permeable to the full effects of a solar radiation; but to receive benefit from a residence there, a certain constitutional strength as well as a fair amount of unimpaired lung must coexist. Dr. Williams reports in his paper seven cases in which a residence in high altitudes was advised, and arrives at the conclusions that the general influence of mountain air is stimulating; that the appetite is increased, digestion and assimilation improved and the circulation and respiration quickened, and that the effect upon the lungs appears to be the result of the inspiration of rarefied air. The chest measurements in some of his cases show a decided enlargement after residence in high altitudes. Sometimes it is the affected side and sometimes the opposite which undergoes enlargement. He has observed also that there is a decrease in frequency of hæmoptysis.

The cases likely to be benefited by residence in high altitudes are as follows:

a. Where disease of the lungs is limited, and no large amount is involved.

b. Cases in which there is no pyrexia and no tendency to pyrexia.

c. Cases in which there is a hemorrhagic tendency.

Dr. Williams noticed in a visit to Davos last Christmas the frequency of pyrexia among the phthisical patients (he differs from Dr. Allbutt in this).

In most of the above varieties complete arrest of the diseased action takes place at once, and what is especially valuable in the influence of mountain air is that it hardens people and makes them bear cold better afterwards. Dr. Williams thinks that laryngeal phthisis or cases with extensive pyrexia are not benefited by high altitudes.

Discussion on the Influence of Mountain Air in the treatment of Phthisis, in section on Medicine of British Medical Association. *British Medical Journal*, Aug. 23, 1879.

At the meeting of the British Medical Association, Dr. Henry Bennet read a paper on "Mountain Air in the Treatment of Phthisis," which was afterwards discussed by Drs. Allbutt, Jogielski, Borchardt, and James Little (Dublin). Dr. Bennet stated that the advocacy of high altitudes in the treatment of phthisis is principally founded on:—1. The presumed immunity of phthisis of inhabitants of great altitudes, as deduced from the sanitary state of the high plains of Central America, and also asserted as regards the inhabitants of the higher Alpine levels; 2. The presumed immunity from phthisis of the inhabitants of very cold countries. Recent investigations, Dr. Bennet thinks, prove the contrary, and in support of his views he cites certain statistics: 1. Dr. Emil Müller, in a work published in 1876, gives the following mortality rates of phthisis at the different altitudes in Switzerland. At an elevation of 200 feet, 10.2 per cent.; at 1,600 feet, 6; in the higher levels, 4,400 to 5,000 feet, it is 9.8 per cent. against 5; above 5,000 feet in a strictly agricultural population it is still 4 per cent.; in the high mountain plains of Central America, Mexico, Anahuac, Quito, which are many thousand feet below the snow line, a comparative immunity from phthisis undoubtedly exists but probably does not depend so much on mere altitudes as on a mild equable climate, winter and summer, which braces the constitution and which allows life to be spent as it were out of doors. Hence Dr. B. concludes that high altitudes do not alone give immunity. 2. Dr. Lombard, of Geneva, who was among the first to call attention to the importance of mountain air in phthisis, gives the result of his researches into the mortality of phthisis in Northern Europe (*Traité de Climatologie*, vol. ii, p. 110). The mortality in the

north of Sweden is 14.7 per cent., in the centre 12.5, in the south 13.1; in London 12.1; in Glasgow 15.8. In Russia the general mortality from 1857 to 1859 was 16.4 per cent.; in the most northern province it was 19; in the adjoining one of Wolgoda, still higher, 20.4 per cent. So Dr. Bennet concludes that extreme polar dry cold and the bright sunlit sky does not prevent in the north of Europe phthysical mortality from being nearly double that of London. Recent experiences at Saint Moritz and Davos, as also at St. Paul, Minnesota, where hundreds of consumptives are now sent yearly, proves that phthysical sufferers may be exposed to intense cold in the coldest regions of the earth and yet do well, probably because they give up living in confinement in breath-poisoned rooms and spend many hours daily out of doors. But it does not prove, in his opinion, that these regions are the best for them. One fatal objection to mountain regions in winter in Europe for any invalid is that from eighteen to twenty hours in the twenty-four must be spent in stove-heated rooms, and in bad weather the entire twenty-four. On the north shore of the Mediterranean, on the contrary, the phthysical patient may live in an atmosphere of pure air with windows more or less open day and night. The thermometric conditions in-doors in thoroughly ventilated rooms with open windows are about the same as those given for Quito—that is they vary only between 56° and 66° . Dr. Clifford Allbutt advocated the views expressed in his articles and also said that with regard to Davos its air was remarkably still and it was not in the cyclonic districts as the Mediterranean was, and he believed that with pulmonary invalids this stillness of the atmosphere was a very great matter. He would prefer a climate where it was honestly cold at night and warm in the day and where he knew what to expect, to a capricious climate.

Dr. James Little (Dublin), who had practiced in Calcutta, said that he had never seen phthisis progress with the rapidity in Europe that it did in the East. In regard to Dr. Müller's statistics of mortality rates of phthisis at high levels in Switzerland, he thought that, even supposing that phthisis was as common as stated, any person who knew the exceedingly unhealthy life of a native of Switzerland living in a close *chalet* would easily understand how he became phthysical. There were only two or three times in the year that they could get animal food, and they lived on coffee and other things not likely to make them healthy. Phthisis was exceedingly common in Ceylon, which had a singularly equable climate.

There were many points in favor of Dr. Allbutt's theory of an aseptic atmosphere. In Canada patients did very well until the snow began to melt. As soon as the spring began the air became loaded with materials which would favor septic changes. Another point which proved this view was the good effect of residence in Upper Egypt in phthisical cases, and if there were suitable means for people living there it would be one of the best places for this disease, owing to the extreme dryness and purity of the atmosphere.

The evidence they had went to prove the truth of Dr. Allbutt's statement that hemorrhages did not occur frequently at Davos.

The Adirondack Region as a Therapeutical Agent in the Treatment of Pulmonary Phthisis. (Read before the Medical Society of the State of New York.) By ALFRED L. LOOMIS, M.D. *N. Y. Medical Record*, April 26 and May 3, 1879.

The Adirondack region is a plateau from about 1,5000 to 2,000 feet above sea level, and from this surface rise mountain peaks more than 5,000 feet in height. Dr. Trudeau, a resident, well describes the advantages as follows: The elevation of this region, its sandy soil, the undulating nature of the country ensures perfect drainage, the absence of cultivation, even of dwellings, precludes the presence of telluric or miasmatic poisons, and we have a purity of atmosphere unknown in more settled districts. * * * That the atmosphere of such a region, especially when set in motion, should, by its contact with myriads of tree tops and pine sheaves become laden with ozone, is a natural sequence. Whatever other properties this gas may hereafter be found to possess, we know that it is a powerful disinfectant and Nature's choice agent for counteracting atmospheric impurities. This process, which is carried on during the summer months by all varieties of trees, during the winter months is maintained by the evergreens, while the deciduous trees are deprived of their foliage. Pine, balsam, spruce and hemlock trees abound, and the air is heavily laden with the resinous odors they exhale. * * * The invalid is here surrounded by a zone of pure air, which separates him, as it were, from the germ-pervaded world, and his diseased lungs are supplied with a specially vitalized and purified atmosphere, free from germs and impurities of any kind, and laden with the resinous exhalations of myriads of evergreens."

Dr. Loomis reports some twenty cases of different forms of

phthisis that have given the Adirondacks a thorough trial. Of these ten recovered, six have been improved, two have not been benefited, and two have died. The ten cases of recovery were those of catarrhal phthisis; of the six cases in which improvement took place, four were those of catarrhal phthisis and two were cases of fibrous phthisis. The two which were not benefited were cases of tubercular phthisis. In the cases of fibrous phthisis there was more or less compensatory emphysema and dilated right hearts. He believes that the climate of the region is better adapted to the treatment of catarrhal phthisis than of any other variety, and the testimony of those who have spent a winter, or more than one winter, is that improvement was far more rapid in the winter months than in the summer. [McB.]

Morbus Winckelii. Dr. WINCKEL describes a new disease which made its appearance among the new-born infants in the Dresden Lying-in Hospital. The disease was epidemic in its character, and lasted, with an intermission of ten days, from March 19th to April 21st. Twenty-three children were attacked; 19 (82 per cent. died) after an average sickness of 32 hours. Of the other four two were discharged cured, and two with symptoms of disease still left. The age of those attacked varied from one to twelve days, the greater number being on the fourth day. The children as well as the mothers were mostly in a normal condition at the time of the attack; 18 of them were on the breast.

The symptoms of the child first attacked after the intermission were as follows:

The mother was delivered ten days after the last case, and had waited before delivery for one day in the room where the sick child was. The child weighed 4,280 grams; was healthy, and cried strongly. On the second day it was given the breast, but took little and seemed unwell. On the next day the symptoms were quite characteristic. Cyanosis over the whole body; conjunctiva slightly jaundiced, and sighing respiration. The urine was pale brown, and contained hæmoglobin; it was passed frequently, and with considerable straining. The urine contained besides epithelium from the bladder and pelvis of the kidney, casts with nuclei and blood corpuscles, micrococci and detritus, urate of ammonia and albumen. The temperature was normal; in no case was there any fever. The condition of the blood was very remarkable. If a cyanotic spot was scratched no blood flowed, but under firm pressure a little fluid of a blackish-brown color

and of syrup-like consistency could be obtained. The blood showed an increase in white corpuscles and numerous small granules (detritus of colored corpuscles), and small particles having a molecular movement. The abdomen not distended, and normally soft. The liver was somewhat enlarged; thoracic organs normal; heart-sounds, somewhat weak. As the disease progressed, convulsive movements appeared first in the extremities and in the muscles of the eye, and finally becoming general, death ensued in a few hours.

Post-mortem appearances. The umbilical vessels were affected in only one case. Liver enlarged and of a dark brown color, and many spots of granular degeneration. Spleen solidified and enlarged; pancreas extraordinarily hyperæmic. The cortical substance of the kidneys was brown, with numerous dark stripes; in the papilla were numbers of infarctus of hæmoglobin. The stomach was always greatly enlarged, swollen out like a balloon, with here and there ecchymoses. Below the deodenum there was a succession of ecchymoses extending over the whole mucous membrane of the intestinal tract; swelling of the Peyer's patches, and enormous swelling of the mesenteric glands. There were ecchymoses in the pleura; in the brain œdema and dilatation of the ventricles, marked hyperæmia and scattered exudations. In some cases there was marked icterus.

As to the ætiology nothing can be said except to point out what was *not* the cause. We may exclude the results of parturition, puerperal infection of the child, poisoning by such substances as morphine, opium, phosphoric acid, etc. It could not be the result of the food nor of the baths (too high temperature) and still less of the clothing and surroundings.

The poison must have been very active, and must have been absorbed directly into the blood, probably through the digestive organs, as its greatest effects are here to be seen. The name proposed by Winckel is cyanosis afebrilis icterica perniciosa cum hæmoglobinuria, but it will doubtless be known by the name of its describer as "Winckel's diseases."—*Deutsche med. Wochenschrift*, 1879, Nos. 24 and 25. [M. D. M.]

On the the cause of rapid death and other serious accidents after thoracentesis. PROF. VON DUSCH relates one case in his own practice, and quotes six others from recent authors showing that at any time (six days to ten weeks) after a successful thoracentesis the gravest accidents may arise during

the process of washing out the sac. Death, hemiplegia, gangrene of the extremities have been observed. Death and paralysis are usually preceded by pallor of the face, loss of consciousness, epileptiform convulsions. The autopsy in several cases (including the author's) has shown the presence of emboli in branches of the pulmonary artery, in the cerebral and other arteries. The sources of the emboli are different. The emboli found in the pulmonary artery of the healthy lung, probably derive from thrombi in the pulmonary artery of the compressed lung, while emboli of systemic arteries are formed from thrombi in the pulmonary veins of the affected side. Clinically, it has been observed that at the time of the fatal occurrence unusual resistance was encountered in passing the tube or in forcing the fluid into the pleura; the orifice was also the seat of contraction. The unusual pressure thus exerted upon the compressed lung, behind the diseased pleura, sets free portions of thrombi which enter the circulations and become emboli.

To avoid these distressing consequences of what otherwise is a simple procedure, von Dusch advises that the greatest care be used to guard against employing unusual force in introducing the canula or catheter, in injecting the fluid, and that every obstruction to the outflow of the fluid be obviated. *Berlin. klin. Wochenschrift*, No. 35, 1879.

[E. C. S.]

ORIGINAL OBSERVATIONS.

RECOVERY FROM PHTHISIS.

BY AUSTIN FLINT, SR., M.D.

TO THE EDITOR OF THE ARCHIVES OF MEDICINE.

Dear Sir : In reply to your request to print brief notes of cases illustrating the propositions in my paper on the self-limitation of phthisis, I beg to note that these propositions are based on cases which are given in my work on phthisis. I could cite illustrative cases which have fallen under my observation since the publication of that work in 1875, and I may do this at some future time. It so happened that at the time of receiving your note, I had just received the history of a case of recovery from phthisis kindly communicated by Dr. Alexander Harvey, Professor Emeritus in the University of Aberdeen, and author, among other valuable publications, of a late treatise on the "First lines in Therapeutics." Dr. Harvey communicates the case as exemplifying recovery under certain hygienic influences, which, at the time the case occurred were in strong contrast with the plan of treatment in vogue. They are not less in contrast with the measures lately advocated by Niemeyer. Self-limitation must have been an essential factor in this case, as it is in all cases when recovery cannot be attributed to curative agencies. In this case, as in other cases, the influences which may have determined the recovery are those which favor or coöperate with an intrinsic tendency, instead of opposing or obstructing it.

I venture upon the liberty of sending to you for publication the case communicated by Dr. Harvey, believing that he will not object to my so doing. The only alteration which I have made is an omission of the name of the patient in full.

Very truly yours,

AUSTIN FLINT.

NOTES OF A CASE OF PHTHISIS, *Illustrative of observations made by Dr. Flint, in the third edition of his Treatise on the Principles and Practice of Medicine, regarding the most successful treatment of that disease, at page 290 as to out-of-door life ; p. 291, as to hunting and sporting ; p. 292, as to resolution and energy ; and specially pp. 293-5, as to alcohol and whiskey.*

Mr. A. G. was one of a family of eight or nine, almost all of whom died of pulmonary consumption after reaching their full maturity, as did also Dr. G. (father of the writer's mother) at the age of forty-nine.

In 1832, when 38 years of age, Mr. G. began to exhibit indications of the family ailment, particularly cough and hæmoptysis.

These indications continuing and gaining ground, Mr. G. went from Aberdeen to London, in the early spring of 1833, to consult Sir James Clark—then Dr. Clark.

Dr. Clark examined the chest very carefully, and wrote Mr. G's medical attendant in Aberdeen to say that he had assured himself of the existence in the left lung (the summit of it) of three separate cavities.

Sir James advised the treatment then in vogue, namely, mild antiphlogistic treatment, and sent him to the Isle of Wight.

Mr. G. followed the advice given him for a time ; but it was for no great length of time. A lawyer (a solicitor) by profession, unmarried, and for long addicted to fishing, hunting, and shooting, to an out-of-door life in the country, to which he had often to resort as a land-agent or factor, and also to the pleasures of the table, Mr. G. did not long submit to the restraints put upon him. He resumed his old habits, "throwing physic to the dogs." "Dum vivimus vivamus" weighed with him, no doubt. He had long been used to a good table, and to an ample allowance of alcoholic stimulants. He ate well ; and, besides taking wine and beer at dinner, he indulged freely in our national beverage—whiskey. Not that he could be said to be in any proper sense intemperate, for he was never known to be the worse of liquor, but that, day by day, as was common enough in those days, he had his two glasses of whiskey-toddy immediately after dinner, and a like quantity of toddy in the evening after supper. On the 12th of August he went to the moors, and the grouse season over, he betook himself to partridge and hare shooting on the low grounds, and to fishing. He was a man of an active, vigorous mind.

Shortly after resuming his old habits, Mr. G. began to amend,

and as time passed on he gained strength and vigor, and was to all appearance in good, robust health. He was altogether what one would call a wiry man—full of nerve. He would, I believe, rather have died than been debarred the good things and the pleasures of this life.

Twenty-two years later, or twenty-three, in 1855, he died of cerebral apoplexy, attended with profound coma, from which he never looked up.

It had long been imagined by his medical and other friends that Sir James Clark had been mistaken in his diagnosis of the case. But on examination after death, it was found that Sir James had been correct. Three separate tuberculous cavities were found in the summit of the left lung, contracted, shrivelled up, and cicatrised.

ALEXANDER HARVEY, M.D.

Banchory, August 16, 1879.

Dr. Flint will himself judge as to the value of this case. But it has long seemed to me to support the views advanced by him in regard to the treatment of pulmonary consumption.

A. H.

A CONTRIBUTION TO CEREBRAL LOCALIZATION.

By S. J. BUMSTEAD, M.D., DECATUR, ILLS.

THROMBOSIS OF THE SUPERIOR LONGITUDINAL SINUS IN THE PUERPERAL STATE.—LEFT HEMIPLEGIA, WITH DEATH IN FORTYEIGHT HOURS.—AUTOPSY.

Mrs. A. E. K., aged 27 years, was, during the night of July 22, 1879, taken in labor with her third child. Was called at 11 P.M. and the child was born at 3 A.M., the labor throughout being as natural as one could meet with. From its duration, it will be readily understood that no extraordinary strain during labor was at all probable. Made one or two visits on successive days, and everything being perfectly normal to all appearances, took my leave of the patient. Was called again on the evening of July 30th, when I found patient had had some fever all day with a hoarse cough, and shortly before I was called, several severe cutting pains in the uterine region had occurred. When I saw her, the pulse was only 90, and no pain could be elicited upon the deepest pressure over any part of the abdomen. There was also a slight

dysenteric diarrhœa present, to which I finally attributed the pain, which did not subsequently occur.

July 31st.—Found her with less fever (though temperature was not taken) and a frequent hacking cough, lochia nearly ceased, particularly the blood.

Aug. 1st.—Still has fever, cough continues though less annoying, and lochia increased as to mucus and pus.

Aug. 2d.—Has fever, though they thought it had entirely subsided the evening before, pulse 90, coughs considerably, voice quite hoarse.

At this visit she was feeling so well, though the pulse ranged from 80 to 90, having been sitting up the day before, and not being able to attribute the slight fever to any other cause than the slight laryngitis and bronchitis found to be present upon auscultation, I again, as I supposed, took my leave.

About midnight of August 3d I was summoned in haste, and found her with a perfect left hemiplegia which had just taken place. She had been asleep, had felt remarkably well that evening (though her husband said pulse at 7 P.M. was 108), and said she thought she would soon be well and about again. After going to sleep she awoke about 11.30 complaining of a numbness and tingling of the left arm, as though she had been lying upon it. The nurse began rubbing it, but upon its increasing steadily the husband came for me, and we found the hemiplegia an accomplished fact upon our arrival. At this time there was not the least implication of the facial or lingual nerves of either side, nor any approach to an aphasic condition. Her mind was also unusually clear, and not the faintest approximation to headache, dullness, or any other bad feeling whatever about the head. The heart's action was very violent, pulse 150, and she complained of some pain about this organ. No paralysis of ocular muscles, left pupil natural, right widely dilated, but she informed me herself and was corroborated by others, that since she was five years of age this pupil had been in this mydriatic condition, and she could not see so well with this eye according to her statement. The history her relatives give of this mydriasis is ; that it occurred during an attack of varicella, and had so continued, though she had no convulsions or other serious illness at the time. Sensation was not at all involved in either arm or leg. Consciousness continued perfect. At 2 A.M. she was suddenly seized with convulsions of the paralyzed limbs, beginning in, and nearly all confined to the shoulder, but slight in the leg. Two such slight attacks occurred,

and ceased either after or because of the administration of from five to six grammes of bromide of potassium, and did not again recur. At this time the temperature was taken and found to be 39° C., which gradually increased to 40° C. during the forty-eight hours she lived. The pulse varied much during this time, dropping down the first twenty-four hours to 108, and then again rising in frequency to 170 before death. No such phenomena as the Cheyne-Stokes respiration was to be seen at any time. The mind continued clear until toward six A.M., when she began to be stupid, speech rather thick, not easily understood, though upon speaking to her she seemed to understand fully what was said. By 10 A.M. unconsciousness was profound, and continued up to her death, which occurred about one A.M. or forty-nine hours after the seizure.

She was a medium-sized, though robust looking woman of fair complexion, who had always enjoyed good health. No previous history of recurring headaches or diseases of the heart, or any nervous affection. Upon a careful auscultation of the heart at this time, no insufficiency of either valves could be diagnosed. Upon a consultation with Drs. J. N. Randall and W. J. Chemwith of this city, we concluded that under all these circumstances the most probable cause, was embolism of the middle cerebral artery or its terminal branches, though we thought some discrepancies with such a diagnosis existed. There had been nothing approaching a rigor throughout the course of the disease.

Nine hours after death an autopsy was made in conjunction with the above-named medical gentlemen. The examination was not extended beyond the contents of the cranium, and was not as thorough as was perhaps desirable, but as it was, the result was so positive and unequivocal that it can hardly fail to be of some service as a contribution to the clinical confirmation of the physiological localization of some motor centres in the cerebral cortex.

It is only with this hope that the case is given to the profession, together with the rarity of thrombosis of the sinus and paralysis therefrom.

Upon removing the calvarium, the external surface of the dura mater seemed free from any abnormal appearance whatever, and no adhesions existed, either with the calvarium or pia mater. Upon examining the base of the brain, the arteries forming the circle of Willis seemed normal excepting the right middle cerebral, which was partly filled with very dark-colored blood; in fact it looked like a vein. Nothing being observed here, the brain was restored to its upright position, and the dura mater removed, when

the lesion became very distinctly visible, as shown in the accompanying diagram. A couple of the superficial cerebral veins upon the right side looked, as Nothnagel so aptly describes them, "as large earth-worms lying upon the surface of the brain," and it seemed as though the diseased patches corresponded to the district of the particular veins, whose outlet was cut off by the large thrombus we a little later found in the superior longitudinal sinus, extending from a point 33 cm. posteriorly from the origin of the sinus, about 5 to 6 cm. further towards the torcular Herophili.



DIAGRAM OF RIGHT LATERAL ASPECT OF THE CEREBRUM, AFTER ECKER.
SOFTENED CONVOLUTIONS SHADED.

The entire lumen of the sinus seemed obliterated and effectually plugged, and the clot seemed purely fibrinous. I removed the clot, hardened it a few days on alcohol, then made sections, and upon examination with the microscope found its structure only fibrinous, enclosing blood cells. No depot of pus or softening in the centre could be observed. The walls in only one or two points showed any alteration which could be designated as inflammatory. The cerebral cortex, excepting those patches, looked quite normal and free from the remotest appearance of congestion or inflammation.

On cutting through and into the diseased patches they were found to extend to the depth of 15 mm. into the cerebrum, were intensely red and already softened, giving way very easily. No diseased condition other than this was noticed either in the cerebrum or cerebellum. It will be noticed that the smallest diseased patch over the first and second frontal convolutions was partly over the region laid down by Ferrier as containing the centres for the shoul-

der and arm, and most anteriorly that in which irritation "causes elevation of eyelids, dilation of the pupils, conjugate deviation the eyes, and turning of the head to the opposite side." A very marked feature of this case was that the two convulsions she had began in and were almost confined to the shoulder of the paralyzed side. I did suspect a paralysis of the levator palpebræ muscles after a few hours, as the perfect closure of the eyes seemed such as would be expected from this condition. This is, however, the nearest in correspondence to the invasion of this centre between the physiological and pathological, but no conjugate deviation of eyes or rolling the head was present, though the suddenness of the onset here might well account for the lack of a preliminary irritative convulsive action. (I have at present under treatment a very well marked case of the conjugate deviation of eyes and rolling of head to opposite side.) It will be seen also that the lesion of the ascending frontal and parietal convolutions corresponds well with the centres of leg, hand, wrists, etc., while the facial region was not invaded, and neither was there any implication of this nerve in this case. It has seemed very strange to me that occlusion of this sinus would not have the same effect upon the cerebral superficial veins of the other side of the cerebrum. Or, notwithstanding the thrombus seemed to fill the sinus, were the orifices of the veins from the other side free, and the sinus still able to pass along some blood, while the veins of the right side were themselves plugged, perhaps at first? Again, was the thrombus originated by a phlebitis in the cerebral sinus or veins, or was it possible for septic matter from the uterus to pass both the capillaries of the lungs and cerebrum, and at last to be the active agent in the production of a clot in this sinus? The latter does not appear probable or reasonable to me, and yet it has the appearance of an accident belonging to the puerperal condition. Would not the general hyperinotic condition of the blood in the pregnant woman be the only known cause in this case?

From the convulsions in the paralyzed part, and the fact of having excited vigorous movements in both arm and leg when introducing the hypodermic needle upon this side, I was led to think of a cortical lesion, while I thought it must have resulted from an embolism. The fact of a very gradual but progressive loss of consciousness, as well as the elevation of temperature following, I could scarcely reconcile with embolism, though I still continued to regard that as the most probable lesion.

OTITIS MEDIA PURULENTA. SPONTANEOUS PERFORATION
OF THE MASTOID ANTRUM,

BY THOS. R. POOLEY, M.D., OF NEW YORK.

The course of the following case of acute inflammation of the middle ear, and implication of the mastoid process, seems to me of sufficient interest to warrant its publication.

On the evening of March 26, 1879, I was asked to see Mrs. A., a lady of about 30 years, who had been referred to me by Dr. Thos. H. Burchard. Four weeks before, in the course of a severe cold and sore throat, her right ear began to pain her. The pain became more and more severe until it was relieved by the appearance, after four days, of a profuse otorrhœa. The relief thus afforded was, however, of short duration, and the pain recurred, but was of a different character and far more severe. Before I took charge of the case she had been under the care of homœopathic physicians, who had given her but little relief.

I found her suffering the most excruciating pain, which had continued for days, and she was completely worn out for want of sleep. Examination of the affected ear gave the following results: There was profuse otorrhœa. After careful syringing, the anterior wall of the auditory canal was seen by the mirror to be so swollen as to render it difficult to ascertain the condition of the membrana tympani. When a view was obtained it was found to be perforated in its anterior-inferior segment. Behind the ear the region of the mastoid was red, painful to pressure, and diffusely swollen. Hearing was reduced to perception of the voice only.

I proposed to make a Wilde's incision over the mastoid at once, but the patient was so weak and nervous that it was deferred until the next day. Leeches were applied over the mastoid and in front of the tragus. Instillations of warm water, and Magendie's solution of morphine and steaming of the ear were ordered for the night. The next day Dr. Burchard administered ether, and an incision of about 35mm. was made over the mastoid through the periosteum, which was reflected and the bone examined; it appeared perfectly healthy. Careful cleansing of the ear was enjoined, the warm water instillation and steaming continued. The operation was followed by a very great improvement which continued until April 3d, when the discharge somewhat diminished and the swelling behind the ear again increased. The wound had been

kept open by a tent ; a poultice was kept on most of the time. It was now proposed to trephine the mastoid, but the patient was very much opposed to an operation, and it was therefore deferred.

On the 5th her condition was still worse ; sleep was impossible, and the pain which involved the whole side of the head, was most agonizing in character. The swelling of the mastoid region had extended up to the superior margin of the auricle and pushed the whole ear forward. The maximum of swelling corresponded to the upper part of the meatus. The necessity for operation was now again urged, consented to, and fixed for the next day.

Accordingly I met Drs. Burchard, Knapp, and Born at 3½ P.M., intending to trephine the mastoid. But, when I removed the poultice from the wound, it was found to be wet with pus, and a probe was readily passed into the mastoid antrum. Nature had anticipated us in the performance of the operation. The opening was enlarged by breaking down, with a director, the softened mastoid cells, and a drainage-tube introduced. The tube employed was made of soft metal, about 1mm. in diameter and 35mm. long, protected at one end by a flange, had several holes bored in its side, and could be cut to any desired length. Through this tube the pus readily escaped in large quantities. Following this there was great relief of the pain and the patient slept well.

From this time on the progress of the case was slowly favorable. The discharge from the opening in the mastoid continued for nearly three months. It was necessary from time to time, as the swelling of the soft parts subsided, to make the tube shorter. Once or twice when this tube seemed to drain the cavity imperfectly I tried rubber drainage tubes, but they always produced so much irritation of the wound and pain that I had to discontinue them after a few hours' trial. The wound gradually filled from the bottom as was shown by the probe, and when there was no longer any discharge from it, the tube was allowed to stay out and the opening in the bone finally closed.

On the 30th of June the patient was dismissed from treatment entirely cured. The site of the wound was memorialized by a deep indrawn scar adherent to the bone. The membrana tympani had healed, but it still remained somewhat hyperæmic especially in the direction of the handle of the malleus and at its periphery. Hearing distance still somewhat impaired, for the watch $\frac{1}{6}$, and there was some tinnitus. She was now allowed to go in the country. Since her return I have examined the ear and find the hearing almost normal. The membrana tympani has returned to its nor-

mal appearance, the site of the perforation being no longer visible.

The case is of interest because it shows how recovery may ensue from nature's efforts alone in mastoid disease. It is a type of one in which the indications for perforation of the mastoid are urgent, and to which the operation, in my judgment, should be limited, *i. e.* tenderness over the mastoid with redness and swelling, the pain radiating from this region to the head, with a great deal of febrile reaction. In the absence of these symptoms, although cerebral symptoms should appear, I do not believe the operation of trephining to be justifiable. There can be no doubt that in this instance if the operation had been performed sooner the patient would have been saved much suffering. But, the delay seemed to be the less dangerous, as although the pain was intense, there was at no time any other evidence of cerebral mischief. The operation would no doubt have been best performed when the Wilde's incision was made, for although the outer shell of the bone looked normal, it is probable that pus had already formed in the mastoid cells, and the drill would readily have perforated. But, the temporary relief afforded by the incision alone, together with the great antipathy to have the operation made, shown by the patient, led to the delay. The use of the drainage tube in the after treatment of perforation of the mastoid gained by the experience which this case afforded, as well as in others in the Ophthalmic and Aural Institute where I had seen it used, lead me to think very highly of the kind of tube which I have mentioned.

Occasionally in the course of the treatment I left it out for a short time and there would always be a return of unpleasant symptoms. Once I was called up in the night because the tube had fallen out and the patient was suffering very much. Upon its reintroduction a quantity of pus escaped and the pain was at once eased. Usually coincident with the onset of the mastoid implication there is a diminution or complete cessation of the otorrhæa. It is worthy of mention that in this case the discharge from the ear although somewhat diminished, continued to be quite profuse, until after the mastoid perforated, after which there was but little escaped from the meatus, although the discharge from the mastoid opening continued for a long time.

In the narration of the case, I omitted to mention that once during the treatment the opening in the mastoid contracted by granulation so much that I thought I should have to enlarge it. But the necessity for doing so was obviated by the introduction

of a small laminaria tent, which in less than an hour had swelled to three or four times its volume and correspondingly increased the size of the opening in the mastoid. This device, which was suggested to me by my friend Dr. E. Hutchinson of Utica, will, I have no doubt, occasionally find a useful application in similar conditions.

AN IRREGULAR FORM OF GOUT.

By FRANK P. KINNICUTT, M.D.

In February, 1878, I was consulted by a gentleman, who stated that he had been suffering for the previous twenty-four hours with soreness of the throat, general malaise and feverish feelings. On examination, a moderate degree of swelling and redness of the left tonsil was discovered. Temp. in the axilla, 101° F. A local application of a solution of ferric alum, in the form of spray, with confinement to the house, was advised. On the following morning, an examination of the throat revealed extreme swelling of the left tonsil and palatine arches, with œdema of the uvula, almost wholly occluding the isthmus of the fauces. The pain and distress were very acute; deglutition and articulation were almost impossible. Regarding it as a well marked case of acute tonsillitis (quinsy), a thorough local application of the ferric alum spray was made by myself, and was repeated by the patient several times during the day, with considerable relief of his distress.

An examination the next morning showed an astonishing improvement in the appearance of the throat. The swelling had subsided in a great measure, deglutition was easily performed, resolution had apparently taken place. The patient, however, informed me that he had suddenly been awakened during the night by an exceedingly acute pain in the ball of the great toe of one foot, which had continued up to the time of my visit. On examination, an acute gouty inflammation of the metatarso-phalangeal articulation of the great toe was found to exist.

At the end of the ensuing twelve hours, the swelling of the tonsil had wholly subsided, with all the symptoms accompanying it. The gouty affection of the toe ran through the usual stages of inflammations of this nature remaining confined to the above-mentioned articulation. Convalescence occurred without further symptoms.

Remarks.—In the literature of the subject I have been unable to find reference to a localization of an acute gouty process in the tonsils. Dr. Wm. H. Draper informs me that he has observed a single case which he regarded as such.

Garrod* relates one instance in which the œsophagus was distinctly affected, so as to cause the greatest difficulty in swallowing, a symptom at once relieved by the occurrence of articular gout.

I am disposed to consider the above case as affording an illustration of such a localization. The very exceptional cases in which a *true* quinsy is aborted after reaching the stage described, the very rapid subsidence of the swelling and all throat symptoms simultaneously with the appearance of a *typical gouty* inflammation, would at least strongly militate against the supposition of a coincidence of dissimilar processes. The anatomical study of gout has demonstrated the occurrence of a deposition of the *materies morbi* of this affection in the fibrous structure of the kidneys and in the lungs.†

The anatomical structure of the tonsils presents at least as favorable conditions for a similar localization. Modern research in the pathology of gout opposes the theory of a metastasis, *i. e.*, the direct transference of the morbid material from one spot to another.

It demonstrates that a localized deposition of urate of soda, from the blood charged with this morbid material, invariably occurs in the gouty paroxysm, preceding and being the immediate cause of the inflammatory process. The severity and duration of the process would seem to depend, in a measure, on the amount of the salt deposited, and the nature of the tissues thereby subjected to irritation. Undoubtedly the intensity of action in one part has a modifying influence upon it in another, a phenomenon which is frequently observed in various morbid conditions. In the present instance, if my supposition in regard to the gouty nature of the tonsillar affection is a correct one, the course of the symptoms, *viz.*, the rapid subsidence of the swelling, etc., in one part, followed immediately by their appearance in another, is only that which frequently obtains in this disease, and an explanation of which is suggested in the above considerations.

* Garrod on Gout and Rheumatic Gout, p. 444.

† Case quoted by Senator, as observed by Liger-Cyclopædia of Medicine.—Ziemssen, p. 115.

ARCHIVES OF MEDICINE.

Original Articles.

ULCER OF THE RECTUM.*

By W. H. VAN BUREN, M.D.

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I HAVE already treated of "fissure or irritable ulcer," an affection of this region which is *sui generis*, and of which the essential element is *fascicular* spasm of the external sphincter muscle.† The present lecture will include all the other forms of ulcer of the rectum, and incidentally of the anus, except those dependent upon cancer.

The subject of ulceration of the rectum is involved in much obscurity in consequence, partly of the somewhat inaccessible seat of the disease, but mainly, as it seems to me, from an indisposition to its thorough exploration. Doubtless also, its symptoms are often mistaken for those of a medical disease, as for diarrhœa or dysentery, or attributed, without scrutiny, to "piles." In fact it is only since systematic exploration of the rectum with the aid of anæsthetics has been possible, that we have been able to make additions to our very scanty positive knowledge of this affection. The imperfect impressions received by the contact of the

* Being the substance of two lectures delivered at Bellevue Hospital Medical College in the preliminary course, 1879-80.

† I mean by fascicular spasm, alternating contraction and relaxation of certain of its fasciculi, and not of the whole muscle, as the expression *spasm of the sphincter* would imply.

finger, or by the eye through the ordinary speculum ani, which are not usually satisfactory, together with the knowledge of what pathology teaches concerning ulceration in general, has furnished the basis of most of the recorded information concerning the nature and causes of rectal ulcer.

Thus far the following facts have been pretty clearly established: that ulceration in its various forms is not uncommon in the lower end of the rectum; that ulcerations developed in this locality, through causes arising mainly from the anatomical structure and functions of the part, do not heal promptly, and ulcers of the rectum and also of the anus tend therefore, as a rule, to become chronic. Mr. Curling heads his chapter on this subject "Chronic Ulcer of the Rectum." From the same causes ulcers of the rectum, as a class, are very painful. Mr. Allingham emphasizes not only the "great misery" they occasion, but also their incurability if neglected. It is also clearly known that certain ulcers of the rectum tend to perforate its walls and give rise to abscess and fistula, and that others extend superficially, and are attended by thickening from exudation; and that, being accompanied necessarily by loss of substance, all ulcers of the rectum contract when they heal; and finally, that cicatrizing ulceration of any considerable extent is the most common cause of narrowing, or stricture of the calibre of the bowel. These possible consequences of rectal ulceration give great interest to everything that throws light upon its causes and nature, for they lead to rational means of cure.

To give you an idea of these causes I have arranged them under certain heads that can be easily remembered, with evidence as to the influence of each in giving rise to rectal ulceration. By this method of study we shall get a knowledge of the means by which it may be prevented, when prevention is possible; and we shall also gain greater certainty in the use of remedies, which is our main object. These

heads are: 1, local traumatism; 2, dysentery; 3, scrofula and tubercle; 4, chancroid; 5, syphilis; 6, cancer.

1. *Local traumatic injury* is by far the most frequent cause of rectal ulcer, as when a laceration or perforation, probably trifling in extent, is prevented from healing by the irritating contact of the fæces, by the varying volume of the bowel, and the violence inflicted by its forcible contraction in the act of defecation. Thus, abrasion has resulted from the prolonged contact of hard masses of fæces, from the presence of a foreign body—either swallowed, as in the cases of teeth, real or false, or fragments of bone, which have been recorded,—or introduced through the anus, of which there are many strange instances; or by the contact of instruments employed to extract them or to remove masses of impacted fæces, an operation not infrequently required. Ulcer may result from failure to heal of wounds caused by surgical operations or other lesions such as are described under the head of “wounds of the rectum.”

The only form of ulcer described by Mayo* (whose excellent monograph was published in 1833), from his own personal knowledge, originated in a “transverse fissure or laceration” which occurred while straining at stool. In one instance it was situated in the posterior wall of the gut above the sphincter, lasted many months, causing great pain, and was finally cured by free, simultaneous division of the ulcer and the sphincter muscle by the knife. Bushe says he has seen similar cases.†

The bursting of a hemorrhoidal vein whilst straining at stool is a variety of traumatism which, according to Ribes, is the most frequent source of origin of abscess and fistula, and

* Observations of injuries and diseases of the rectum, by Herbert Mayo, F.R.S., surgeon to the Middlesex Hospital. London, 1833, p. 11

† This author describes the ulcer in question as “caused by the forcible extrusion of a fold of mucous membrane, which, lapping under the mass of indurated fæces,” is forcibly dragged down, everted, and torn across. *Op. cit.*, p. 69.

also of ulcer in the locality occupied by internal hemorrhoids. Such a lesion, if it should not perforate and cause abscess and fistula, would nevertheless, like a varicose ulcer of the leg, heal very slowly, if at all, in consequence of the dilated condition of the surrounding hemorrhoidal vessels. Internal piles, as is well known, often take on inflammation from the bruising to which they are subjected, and I have seen ulceration on the surface of the projecting tumors, as well as in the clefts between them.

The lodgment of irritating particles in the *lacunæ* just above the internal sphincter was regarded by Physick as a not infrequent cause of ulceration.*

Bruising of the walls of the rectum between the sacrum and the child's head in protracted parturition produces in certain cases a variety of traumatism recognized as a cause of ulceration and stricture by Brodie, Curling, Allingham, Mollière and others of the best practical authorities in rectal diseases. I had once in my wards in the New York Hospital a healthy, respectable woman of 35, with an extensive surface ulceration surrounding the gut for two or three inches above the sphincter, which followed a long, hard labor. The ulceration finally got well, but its cicatrization resulted in the formation of a stricture. This case left in my mind a very strong impression that the constant liability to injury sustained in this way must go far towards explaining the greater frequency of ulceration and stricture of the rectum in women. This impression has since been confirmed by similar instances. Whilst it is difficult to demonstrate its absolute truth, I feel warranted in asking you to regard this source of traumatism as a not uncommon cause of rectal disease in the sex, and as a reason why women are so much more frequently the subjects of these diseases than men.†

* American Cyc. of Pract. Med. and Surg. Art., Anus. Phila., 1836.

† In Mr. Curling's table of twenty-eight cases of stricture of the rectum,

Whilst a healthy woman would soon recover from the bruising of the rectum, as of other parts damaged in a prolonged first labor, a delicate, strumous, or syphilitic subject might suffer from retarded repair and its consequences in the way of chronic ulceration or stricture after such an ordeal. There are some defective constitutions in which any traumatism, however trivial, is liable to become the starting-point of serious disease.*

2. *Dysentery*.—It may be assumed that ulcers form in the rectum in the same way as the gastric ulcers of young women, or the ulceration of the duodenum after a surface burn, or from any of the causes of ulcer in other portions of the intestinal canal. Rokitanski suggests the softening of small tumors in the wall of the bowel. Esmarch asserts that ulcer with loss of substance, of unknown origin, may occur, and cause perforation and peritonitis. It is well known that perforating ulcers take their origin in the intestinal glands in the intense congestion attending the effort to eliminate a blood poison, as in typhoid fever. Dysentery, which is usually regarded as the result of a blood poison, must be a comparatively rare cause of rectal ulcer, or this disease would be far more common than it is, especially in warm countries where dysentery is so prevalent; and yet cases of ulcer from this cause are mentioned by the best authorities. Thus Cruveilhier in his pathological atlas† has a plate of what he calls a “dysenteric ulcer” of the rectum, taken from the dead body of a young woman of 20, which is surrounded by a thickened margin, and is already producing stricture. Allingham mentions one or two cases of stricture originating in dysenteric

* “twenty were women, and in nine of them the disease commenced after labor, in some instances being distinctly attributed to an injury at that time.” (Op. cit., p. 124.)

* Golebert's case, recorded under the head of *Syphilis*, is of interest in this connection.

† Livraison, xxiii, pl. 1.

ulcer, but in persons from the tropics. Prof. Annandale, of Edinburgh, reports a case* of diarrhœa of three years duration, in a medical officer of rank long a resident of India, cured by the surgical treatment of an ulcer which he discovered in the rectum an inch above the anus; it was as large as a dime, with depressed centre and indurated borders, and not very painful to the touch. The patient had from four to six soft stools a day, and had not had a "formed" stool for three years. Admitting that there are some cases beyond a doubt of rectal ulcer from dysentery, I must call your attention to the conclusion in this case: The looseness of the bowels, "which had resisted many remedies, ceased promptly after the cure of the ulcer," which was effected, with some delay, by incising it freely, and keeping the patient on a milk diet. The conclusion was arrived at by both the surgeon and his patient in this case, that "the ulcer was the cause of the dysenteric symptoms" from the beginning.

Now the term dysentery is very generally applied to cases of frequent stools accompanied by tenesmus; and frequent stools with pain are also the prominent symptom of the disease we are studying, so that an ulcer of the rectum may have been simulating diarrhœa or dysentery for an indefinite time, and when finally discovered on local exploration may be wrongly ascribed to the preceding dysentery, as in Mr. Annandale's case, whereas the ulcer has been, from the first, the cause of the symptoms. I remember the report of a case of stricture in a woman of 33, operated on in a Parisian hospital, which terminated fatally in a month after the operation, in consequence of rapid tubercular infiltration of the lungs. The case was headed "dysenteric stricture," and it was distinctly stated in its history that the stricture followed a dysentery of a year's duration,

* British Med. Jour., p. 681, Dec. 21, 1872.

during which time she had twenty bloody stools a day. As such steadily obstinate dysentery is not common in France, I suspect, in view of the cause of death, that the so-called dysentery may have been really due to tubercular ulceration, which eventually resulted in stricture.*

3. *Scrofula and tubercle*, terms significant of defective nutrition and power of repair, and also of the deposit—by preference in the glands—of a peculiar substance known as tubercular matter, are undoubtedly the causes of a large proportion of rectal ulcers. They act in two ways: either in retarding the healing of a local traumatism, which thus becomes a chronic ulcer; or as a directly exciting cause of ulceration—as when tubercular deposit actually takes place in and around the glandular follicles of the rectum and provokes suppuration. Tubercular granules have been seen by the aid of the microscope imbedded in the granulation tissue which constitutes the surface of the ulcer, and also blocking up the vessels which should supply these granulations with blood.†

In the disease known as *tubercular diarrhœa* small round ulcers with rather sharply cut edges, taking their origin in the manner just described, are found in all parts of the intestinal canal. A gentleman from the west, with reddish-brown hair and eyes, and a history of chest symptoms earlier in life, lately consulted me for frequent bloody stools, with the idea that his disease was in the rectum. I discovered, on examining the bowel, only some trifling erosions, with intense general redness of its surface; but in more advanced cases of this nature well-marked ulcers are found in the rectum. Habershon, in his recent work on diseases of the abdomen, gives the post-mortem appearances in several such instances of fatal tubercular disease.‡

* Reported by a house surgeon of M. Cusco, in Bull. Soc. Anat., 1876, p 684.

† Malassez, Bull. Soc. Anat., Paris, 1871, p. 12.

‡ One case is headed “*Phthisis, ulceration of the rectum and sigmoid flexure*,

These are hopeless medical cases cited to give you a broad conception of tubercle as a cause of rectal ulcer; but there are many cases not properly called tubercular diarrhœa, where ulceration exists in the rectum alone and where healing is delayed by the presence of the scrofulous vice in the system, in which surgery may afford valuable aid.

Mr. Curling reports the case of a sea captain, with tubercular deposit in both testicles, who complained of severe scalding pain lasting about ten minutes after an evacuation, with a little blood in his motions, and a constant slight discharge. He found, on examination, at a short distance within the bowel, an ulcer the size of a half-dollar, with indurated edges, its lower part being within the circle of the sphincter. This ulcer was cured in about a month.

In a married woman of 25 with scars in the neck from strumous disease he discovered extensive ulceration of the bowel, which he describes as "an irregular surface, in parts rugged and hard, and at some points exquisitely tender." This woman improved under treatment, but more slowly, and as the ulcer healed he discovered about two inches from the anus a distinct contraction which was being produced by the cicatrization of the ulcer.

A young engineer was lately brought to me by Dr. Adams, of Putnam Co., who, two months before, had fallen in a sitting position upon an upright iron rod an inch in diameter which penetrated the anus, as was estimated, nearly two inches. He did very well for three weeks, but had since then ceased to improve. There was a discharge of pus with the stools, and a complaint of pain referred to

hemorrhage from the vessels." An adult, cause of death; discharge of blood from rectum, with diarrhœa. Inspection: tubercles in both lungs and larynx. In lower part of ileum a few tubercles, and commencing ulceration. The transverse colon presented several ulcers, oval in form, half an inch in breadth, with indurated irregular margins. In the sigmoid flexure and rectum the whole of the mucous membrane was affected; it was almost covered with patches of ulceration, and in some parts there were portions of adherent diphtheritic membrane.

the neck of the bladder. I found an ulcer in the anterior wall of the rectum over the prostate, about an inch and a half from the verge.

Its edges were sharply cut, and there was no appearance of healing. The patient had a delicate aspect, and a history of former chest symptoms. I advised cod-liver oil and change of air.

When we call to mind the prompt recovery recorded as following more extensive traumatic lesions in vigorous subjects, the influence of a strumous diathesis in arresting repair in a case like this is not difficult to recognize.*

Tubercular ulcers are not rare at the anus, where they often produce small fistulæ. I have already alluded to the minute indolent "dermoid" abscesses in which they take their origin. Within the rectum they are ordinarily multiple, commencing in the follicles; their tendency is to become confluent and encircle the gut in broad bands with borders infiltrated by tubercular matter, and to result, when they heal, in stricture.†

The anus and rectum are occasionally the seat of persistent and destructive ulceration resembling "*lupus exedens*," which is regarded by some as a manifestation of scrofula.‡

* Mollière gives the case of a man of 28, who entered hospital with an extensive ulceration with hard, sharp edges occupying about half the circumference of the anus, and extending an inch or more within the rectum. The patient had been healthy until four years before, when the ulcer made its appearance at the anus without any known cause. It oozed a little blood occasionally and was but slightly painful at first, and has only given serious trouble whilst at stool within the last two months; and he has latterly failed in health and begun to cough. The patient is now emaciated, and has dyspnoea and purulent expectoration. This man died shortly afterwards, and, on inspection, cheesy tubercles were found at the summits of both lungs, with recent tubercular infiltration on the right side. Tubercular deposit in the inguinal glands. Under microscopic examination of the parts involved in the rectal ulcer, well-marked granules of tubercle were found in the infiltrated connective tissue and integument. (Op. cit. p. 651.)

† Emile Vidal, Dict. Encyc. Art. Rectum. Verneuil is reported as saying, at a discussion at the Surgical Society of Paris, (Bull. de la Soc. de chirurgie, 1873, p. 11), that the tubercular ulcers of the rectum never heal. This is certainly too strong a statement.

‡ This form of ulcer is called by the French "*scrofulide maligne*" and is a phase of the disease of the vulva described by Huguier under the designation of "*esthiomène*" (v. *Esthiomène*, Nouveau Dict. t. xiv.)

I should infer from my own observation that most of the extensive and incurable cases of ulceration of the anus and rectum encountered from time to time in the hospitals and which almost resemble cancer in their hopelessness, are the result of bad habits of life in women of strumous constitution upon which syphilis has been engrafted.

I have seen ulceration of the rectum, and also of the colon, as a result of *inimition* from defective nourishment, in cases where there was no room for suspicion of scrofula. Vidal * cites a case of a prisoner who had become lenteric from prison fare, in whom he saw numerous ulcers of the colon and rectum after death.

Ulceration just above a stricture of the rectum is a common occurrence, as a result of habitual over distention and exaggerated contractile efforts. It is accompanied by muscular hypertrophy of the walls of the portion of bowel which has been habitually overstretched, and is preceded by congestion and thickening of its mucous membrane.†

In an octogenarian with excessive narrowing of the anus from infiltration and thickening of the sphincter and consequent obstruction, attended by great pain, a perforating ulcer was found in the posterior wall of the rectum over the coccyx, the bones of which were found after death in a steracaceous abscess. In this case death took place after a period of utter inability to take food, in consequence of suddenly developed peritonitis, which was found on inspection

* *Ct supra.*

† Gosselin in his much-quoted paper on *syphilitic strictures of the rectum* (in the Arch. gén. de Méd., Dec., 1854, p. 666), gives the result of a good study of the walls of the rectum above a stricture, explaining the changes leading to ulcer in this locality, and applicable to cases of stricture from any cause. He found an injected and eroded mucous membrane, yielding pus freely. By erosion he means loss of epithelium and thickening by exudation of the surface beneath. Robin, who examined one of his specimens microscopically, says "the eroded surface presents only free epithelial nuclei, with pus globules; the cells of columnar epithelium are almost entirely wanting." The muscular coat is hypertrophied from effort, mainly in the circular fibres; it is twice its natural thickness. These ulcerations in the gut above a stricture are uniform; they extend all around its circumference and four or five inches upwards.

to have been caused by a perforating ulcer of the colon. There were three or four other ulcers in the colon, apparently the result of imperfect nutrition and over-distention. As I have said, perforating ulcer above a stricture of the rectum is a possible occurrence. Cooke, in his edition of Morgagni, relates the case of a young lady who had been afflicted with a "scirrho-contracted rectum" for some years, and finally died of obstruction. On examining the body he found an ulcer large enough to admit the end of a little finger, above the stricture, leading to a large cavity, which was filled with pus and excrement, in the hollow of the sacrum.*

The very rare form of disease known as "*rodent ulcer*" sometimes attacks the anus, and extends thence into the rectum. The pathology of this peculiar affection is not entirely determined; it has been by turns regarded as a variety of cancer, of "malignant" scrofulous ulceration, and of phagadæna, and is possibly a variety of epithelioma with certain peculiarties referrible to changes in the local nerve tissue hitherto unexplained. It is well to be able to recognize this formidable disease which, from its unusual occurrence, is almost always a source of error as to prognosis, which is of the worst. It occurs in young adults as well as in middle and later life. Allingham has a case in an apparently healthy country girl of 17, and Curling in an aged medical man who died with the disease at 81. The ulcer is smooth and red, with a well-defined margin but no thickening of base and very little at the edges. It advances on the surface, exceptionally in depth, and at the anus seems to be always the seat of intolerable pain. Rodent ulcer is incurable by any form of treatment except, as in the face, by thorough and most liberal excision, practiced early. Deep cauterization may arrest its progress and be followed by a

* Letter xxxii, p. 9, note.

healthy granulating surface, but only for a short time. The granulations melt away, and the peculiar pain returns inexorably. Entire and free removal, even involving the anus and lower end of the rectum, is justifiable when it can be accomplished; and, when this is not possible, colotomy may mitigate the intense suffering—always very much aggravated at stool, by which the patient is sooner or later worn out.

4. Of the *venereal* diseases which cause ulceration of the rectum, syphilis should be studied apart from the "*contagious venereal ulcer*" or *chancroid*. The latter, which I shall first consider, is a purely local affection; whereas the former affects the whole organism. Much of the difference of opinion as to the causation of ulceration and stricture of the rectum by these diseases is due to the fact that the distinction between the simple local sore—chancroid, and the constitutional disease—syphilis, has been ignored, even since the different nature of these affections was demonstrated by Bassereau in 1852; and the terms *syphilitic*, and *venereal*, have been loosely employed as identical in meaning, even by those who have accepted the conclusions of Ricord and Bassereau, and this error I am anxious that you should avoid.*

One of the distinctive characteristics of the non-infecting ulcer or chancroid, is its liability in exceptional cases to become chronic, whilst still secreting pus of a poisonous quality, and another is its tendency to take on the unhealthy

* John Hunter, one of the highest authorities amongst English surgeons, believed that all the venereal diseases, *i.e.*, those diseases usually communicated in the venereal act, were due to one and the same contagious poison. Ricord, who translated the writings of Hunter on this subject into French, succeeded in demonstrating that the poison of gonorrhœa was an entirely distinct virus, and his conclusion is now universally admitted. Bassereau, subsequently, by following up Hospital cases to their sources of origin, demonstrated that of the venereal ulcers known as chancres, one was a local sore—what we now call chancroid, caused by a totally different virus from the other, which is the disease known as syphilis. Hence the term *syphilitic* is applicable to the latter alone; whilst the term *venereal* may be properly applied to all three diseases.

condition called *phagedæna*, which means an indefinite extension of the ulcerative process; and these, with the additional quality of inoculability upon any abraded surface in its neighborhood on the patient's body, which belongs only to this sore, explain how in the female, from contiguity of parts, the discharge from a chancroid, which is always abundant, may inoculate a crack or fissure at the anus. They also explain how, when reproduced in this more exposed locality, the new sores may take on the phagedænic condition in consequence of persistent local irritation, and, traveling within the anus, may invade the rectum. This is a recognized mode of explaining the presence of chancroidal ulceration of the rectum; but I cannot help thinking that the singular facility with which rectal ulceration may be derived from anto-inoculable sores situated on the female genitals has led many to overrate the frequency of its origin from this source. That it does take place in the lowest class of prostitutes, and not very rarely, my own observation in the Bellevue and Charity Hospitals in former years compels me to believe. I have seen four or five radiating fissures at the anus, the result of straining at stool, inoculated by vaginal discharges charged with the poison of chronic vaginal chancroid trickling down from the vulva. I have also seen chancroids at the anus become phagedænic and extend within to the rectum; and have verified at a later period, the existence of stricture of the rectum from the cicatrization, as there was every reason to believe, of this same ulceration.*

I have certainly seen this in several cases, but only in women. The extreme rarity of chancroidal ulcer of the anus or rectum in men is a circumstance that seems to confirm the mode of origin in women which I have just

* I have difficulty in understanding how so practised an observer as Mr. Allingham is able to assert so emphatically as he does in his last edition, (London, 1879, p. 222), that in the early development of rectal ulcer and stricture "no ulceration is found near the anus, nor at the aperture."

indicated, and it is held by many to explain the undoubted fact that stricture of the rectum is so very much more common in women. To my mind there are other reasons, already given, for the greater frequency of rectal stricture in women. The evidence of Prof. Erskine Mason as to the frequency of chancroidal ulceration of the anus and rectum, derived from his experience at the Charity Hospital, is very positive.* Dr. H. Bridge has also placed upon record "a case of chancroidal ulceration and stricture of the rectum," which he treated very successfully by colotomy.† The same opinion is held by most of the surgeons of the Charity Hospital, which affords such an extensive field of observation of venereal diseases. Both Mason and Bridge arrive at conclusions excluding syphilis from the list of causes of rectal ulceration and stricture, and confirming the views of the French surgeons, Gosselin and Desprès, on this subject. From what I had seen of the effects of chancroidal and phagedænic ulceration in women, I also, ten years ago, was disposed to underrate the influence of syphilis upon the rectum, but from later experience and additional evidence I am compelled to reconsider the opinion.‡

* *v. Amer. Jour. Med. Sciences*, Jan., 1873.

† *Archives of Dermatology*, New York, Jan., 1876, p. 122.

‡ The attention of the profession was first called to what he considered the local character of the ulceration of the rectum causing stricture—at that time generally called venereal, and assumed, of course, to be syphilitic—in 1854, by Gosselin, afterwards the successor of Velpeau at La Charité in Paris (see his original paper on "syphilitic strictures of the rectum, in the *Archives Générales de Médecine*, t. iv, p. 667, 5^e serie, and also in the article "Anus," in the *Nouveau dictionnaire de Méd. and Chir. pratiques*, Paris, 1867.) I quote Gosselin's conclusion in his own words, and confess that I have never been able clearly to understand it: "So called syphilitic stricture of the rectum is not one of the constitutional manifestations of syphilis, but a lesion resulting from the proximity of a chancre of the anus." It is noticeable that in this original paper Gosselin does not formally recognize Bassereau's new doctrine as to the local nature of chancroid, for he speaks of auto-inoculable and freely suppurating chancres as "syphilitic;" and he makes no account of the fact that most of the twelve cases on which his paper is based were syphilitic women. By the term "chancre" he means both the primary lesion of syphilis, and chancroid; and he includes also the ulceration excited in the mucous patches of true syphilis when seated at the anus by inoculation through contact

In ordinary practice I do not think it likely that you will meet with cases of ulcer of the anus or rectum from chancroidal poisoning except in the lowest classes of loose women; but you should be aware of the possibility of its occurrence—which to my mind involves a contingency somewhat analogous to the liability to conjunctivitis in gonorrhœa. For some reasons, the soft or chancroidal sore seems to be less common than it was twenty years ago, especially amongst people of the better class. A recent French writer even suggests the possibility of its becoming extinct.*

In a case of which the history and surroundings suggest the possibility of this cause for an ulcer of the rectum or anus, you have the test of inoculability at your command, and by this the diagnosis may be certainly determined. If

* Mauriac, *Rareté actuelle du chancre simple*, Paris, 1876.

of pus from a chancroid, and this latter, as all his observations were made upon women, was presumably derived from vaginal discharges.

Desprès, after some years at the same hospital, Lourcine—the female venereal hospital of Paris—published his observations on this same subject, (in the *Arch. Gén. de Méd.* for March, 1868). He examines Gosselin's conclusion above quoted, and endorses it fully, adding that "with our present knowledge the law can be laid down that most non-traumatic strictures of the rectum are the result of ulceration taking its origin in neglected phagedænic chancres of the anus and rectum." If Gosselin's conclusion was somewhat obscure, the subject is hardly made clearer by his successor whose rather dogmatic position is certainly not justified by the cases he cites. Desprès subsequently endeavored to enforce his views concerning phagedæni-m before the surgical society of Paris at the meeting of February, 1872, (*Bull. de la Soc. de Chir.*, 1873, p. 47 and seq.), and illustrated them by additional cases which he analyzed especially for this purpose; but his conclusions do not seem to me to be logical. They were not accepted by those of his colleagues who took part in the discussion, MM. Alph. Guérin, Trélat, Panas, Verneuil and others, and I do not think that they have since been regarded with any more favor. Fournier and others who have since written on the subject, do not accept them. In fact this subject was studied by both Gosselin and Desprès at the same hospital, upon women almost exclusively, and women of the same class, and, with the recognized difficulties which attend the investigation of a subject so obscure, it is not surprising that their conclusions have not been accepted as final. Gosselin's idea was to demonstrate that rectal ulceration and stricture is not a common and legitimate manifestation of true syphilis, but an epiphenomenon. Desprès adds that the most frequent explanation of the epiphenomenon is phagedæni-m.

Curiously enough both of these surgeons agree that the origin of the ulceration may be a true chancre, a chancroid, or a syphilitic mucous patch inoculated by a chancroid. I cannot see, in the light since thrown upon the subject, that their labors can be regarded as having established any logical proof either of the rarity of syphilis, or of the greater frequency of chancroid, as causes of ulcer and stricture of the rectum. Fournier, their successor in the same field of ob-

the contagious period shall have passed, the ulcer left behind is to be treated as though it had arisen from any other cause.

5. *Syphilis*.—One of the earliest practical consequences of the demonstration by Bassereau, in 1852, of the non-identity of syphilis and what we now call the chancroidal ulcer, was the doubt raised by Gosselin, in 1854, as to the common occurrence of ulceration and stricture of the rectum from *syphilis*. Before this epoch these lesions, when not directly the result of traumatism, were almost universally attributed to syphilis, and treated, after the manner of Desault, by the local application of mercurial ointment and bougies, and internally by anti-syphilitic remedies. The frequent ill-success of anti-syphilitic treatment in curing the rectal lesions led to doubt in the minds of practical men as to the truth of the prevalent

servation, describes cases as examples of syphilis which are almost identical with the cases on which their conclusions are based, and in formal published lectures on syphilis of the rectum, hardly mentions chancre as a cause of rectal disease. (*Clinique de Lourcine—lésions tertiaires de l'anus et rectum—syphilome ano-rectal—rétrécissements syphilitiques du rectum*, Paris, 1875). Moreover, Fournier's professed views are in accordance with those of his contemporaries among the clinical teachers of Paris, (*v. Bull. Soc. Chirurg.*, 1873), and with those of the English surgeons, as set forth by Allingham (*loc. cit.*, London, 1879, p. 245). They are also for the most part confirmed by the latest histological study of specimens of these diseases by Malassez, (*Trélat, Dict. Encyc.*), and Cornil, (*Leçons sur la Syphilis*, Paris, 1879).

In Dr. Bridge's case, which was also seen by Dr. Mason and Dr. Bumstead, and which is very carefully recorded, the following points seem to me worthy of note: a prostitute of 38, married, but no mention of childbirth. First seen in April, 1874, in hospital, broken down by dissipation and excess, said to be consumptive, and actually bed-ridden on account of painful and extensive rectal ulceration and anal fissures, and using morphine freely. "About the anus were a number of flat, pigmented, nipple-like, fleshy protuberances; at the edge of the anus and extending up into the same were four or five deep fissures which, on dilatation of the sphincter, were converted into large non-indurated ulcerations, with deep, dusky red surface, shewing no indication of a reparative effort. An inch above the margin of the anus, and as far up as could be seen by the aid of a medium-sized hard rubber vaginal speculum, the mucous membrane was apparently wholly wanting, and in its place, a continuously ulcerated, freely suppurating, grayish surface. Examination with the finger revealed the existence of a stricture of large calibre about $\frac{3}{4}$ inch in diameter, just above the internal sphincter ani. No history of syphilis could be obtained." Five years before she had two profusely suppurating painful sores at the orifice of the vagina near its junction with the perineum, as shewn at the present time (April, 1874), by a large cicatrix and by the presence of a bridge of mucous membrane in that place. Shortly after this she began to complain of the rectum, and was told she had "piles." "She had undergone anti-syphilitic treatment, and subsequently,

belief in their syphilitic origin, and to this doubt Gosselin first gave distinct expression; hence the attention which his paper has commanded. But in the quarter of a century since its publication a reaction has taken place against his views, probably because they have been found not in accordance with the facts of cases since observed, and at present, in England and Germany, as well as in France, and I think I may say in our own country, the evidence in favor of syphilis as a cause of rectal disease, not only in the way of direct manifestation in its usual forms, but also in its indirect influence as a diathesis, in retarding repair and disturbing nutrition by a tendency to abnormal and purposeless cell proliferation, is again regarded with favor. The more thorough exploration now practicable in rectal disease through the aid of anæsthetics, and the slowly advancing certainty as to the anatomical lesions of syphilis,

under my direction, she was brought fully under the influence of mercury and iodide of potassium; but in no case did any symptoms of improvement in the ano-rectal disease manifest themselves; on the contrary the disease was aggravated, if anything. This specific treatment was instituted the last time consequent upon an attack of iritis in the left eye, which quickly subsided." As no treatment brought any relief to the pain and irritation of the rectum, and she was losing flesh from continued suppuration, although there was no serious obstruction at the seat of stricture, lumbar colotomy was done in July, 1874. After this she began to improve; the purulent discharge gradually ceased, and the ulceration healed, "leaving a valve-like stricture just above the internal sphincter," and her general condition was so good that about a year after the operation "she left the hospital and resumed her former habits as a common prostitute."

The difficulty in getting at the truth as to the share actually borne by chancre and syphilis in the rectal lesions of a common prostitute is illustrated by the circumstance that there is nothing in this exceedingly well treated case that would absolutely forbid the conclusion that this woman was syphilitic previous to the chancreoidal contamination, and that she might have had already mucous patches of the anus and rectum which were abraded and inoculated by proximity, or that she had at least a degraded quality of tissue, from the existing diathesis, inviting destructive ulceration. Few common prostitutes escape syphilis for six years, and this time had elapsed before Dr. Bridge saw this patient; and she had already taken mercury enough to suppress all ordinary manifestations of syphilis in a mild case. The circumstance of the failure of anti-syphilitic remedies to cure has no significance, for mercury will not cure chronic chancreoidal ulceration even when engrafted upon a patient suffering from the syphilitic diathesis, nor syphilitic strictures when they have undergone fibrous degeneration. On the other hand she had, when first seen, a stricture of large calibre that had never contracted so as to cause obstruction; and she had, subsequently, an attack of iritis. When her chancreoidal ulceration finally healed under rest, the resulting cicatricial structure seems to have been more valvular and sharp-edged.

are furnishing the evidence on which this change of opinion is based. It is far from complete, but sufficient to compel us to modify former opinions, and wait for further facts.

I will endeavor to give you a statement of what is certainly known of this subject at present.

Ricord and his pupil Fournier, and Vidal de Cassis, each records an instance of a primary syphilitic lesion, or true chancre, in the rectum; the latter asserting that the induration accompanying the primary sore in his case was so considerable as to narrow the calibre of the gut. I had a ship's boy in my wards at the New York Hospital, in 1855, with a true chancre at the anus followed by a well marked secondary eruption: but I have never seen the lesion in the rectum. Such cases involve sodomy. Happily they are rare. Fournier says he has looked in vain for a true chancre in the rectum during six years' service at the Lourcine.

I have never recognized secondary ulceration of undoubted character in the rectum, and recorded instances are wanting, but mucous patches are quite common at the anus, and they are liable to abrasion and to ulceration from local traumatic causes, and to chancroidal inoculation. When we consider how rarely the rectum is carefully explored except where painful symptoms render this measure necessary, and that secondary eruptions are generally painless, the absence of recorded cases of secondary ulceration is not difficult to understand; whilst the common occurrence of secondary syphilitic manifestations at the other end of the alimentary canal—in the mouth and throat, justifies the assumption that they also occur, if not so frequently, in the rectum. Mollière* describes an ordinary whitish mucous patch which he saw in the rectum of a syphilitic subject; it was situated two inches above the anus. This author, without, however, giving any positive evidence in favor of his opin-

*Op. cit. p. 641,

ion, expresses in general terms a strong suspicion that syphilitic ulcerations of a serious character do occur in the rectum, and that the grave cases of rectal ulceration "so well described by the English surgeons" should be referred to syphilis; he also adds his testimony that specific treatment has no curative effect upon them.

Of the presence, in some cases of syphilis, of *tertiary* symptoms—gummy deposits and ulcerations—in the rectum, we have more positive evidence. More circumstantial than anything I can furnish from personal experience is the statement by M. Emile Vidal * that he distinctly made out nearly a dozen circular ulcers in the rectum of a man with syphilis at the *Maison Municipale de Santé*, in Paris, and that they got well under the influence of the iodide of potassium.

The actual presence of gummy tumors in the walls of the rectum has been admitted by implication, by Virchow, Cornil, and Fournier, but said to be exceedingly rare. The latter † refers to an authentic case cited by Prof. Verneuil. Esmarch ‡ confirms the existence of gummy tumor of the rectum. So, also, does von Bærensprung, of Berlin. Cornil gives a detailed account of a gummy tumor of the stomach, which he examined histologically. § Fournier, admitting isolated tertiary ulcers and gummy tumors in the rectum as possible but very rare, assumes as an undoubted fact that tertiary ulceration may extend upwards into the rectum from the anus, and relates the case of a young woman

* Author of the medical and etiological portion of the article "Rectum" in the *Dict. Encyc. des Sciences Méd.*, p. 686.

† Op. cit., p. 9.

‡ Pitha u. Billroth Handb. Erlangen, 1872.

§ *Leçons sur la Syphilis faites à l'hôpital Lourcine*, Paris, 1879, p. 406. See also Cornil and Ranvier, *Histologie Pathologique*, Paris, 1876, p. 856, and seq., for authorities who have reported cases of syphilitic ulceration of the intestine, and their bibliography at p. 1231. The authors say that these sources contain several observations which are very conclusive. See, also, the chapter by Leube "on diseases of the stomach and intestines," in Ziemssen's *Cyc. of the Pract. of Med.*, New York, 1876, vol. vii, p. 109.

in whom a phagedænic gummatous ulcer of the buttock reached and entered the anus and extended thence up to the rectum. This same authority has formally described, under the name of "ano-rectal syphiloma," a thickened and lumpy condition of the anus and rectum, which he asserts does not tend to ulceration and which is, probably, gummatous exudation in a diffused or infiltrated form.* I have distinctly recognized this form of syphilitic disease of the rectum, and have seen it disappear under anti-syphilitic treatment.† The following case from Virchow is of interest in this connection: A woman had been often under treatment at the Charity Hospital of Berlin during a period of ten years for different symptoms of tertiary syphilis in the skin and bones. Her nose was sunken. The autopsy shewed nodes of the frontal and parietal bones and of the tibiæ. There were extensive cicatrices of the *velum palati* and the pharynx and an internal pachymeningitis of the hæmorrhagic variety, of the cranial bones. The rectum was the seat of ulcerations—some recent, covered with diphtheritic exudation, and others cicatrized. There were three large scars in the jejunum, and numerous whitish tumors in the corresponding portion of its serous coat.

Virchow, it should be observed, acknowledges the impossibility, in the absence of gummatous deposit, of distinguishing a syphilitic ulceration of the rectum from ulcers caused by defective nutrition, by tubercle, typhoid, or dysentery; and Cornil, who is the most recent and probably the best authority in the histological pathology of syphilitic lesions, speaks very doubtfully as to the distinction, in certain cases, between gummatous and tubercular ulceration.

Mr. Allingham in his last edition reasserts his belief in the frequency of a syphilitic cause for rectal ulceration,

* Op. cit. supra.

† *Am. Journ. Med. Sci.*, Oct., 1879, p. 336.

but is somewhat general in his terms. He sums up his very large experience as follows: "In women" (with ulceration and stricture) "forty-two out of seventy-nine had suffered or were suffering from undoubted constitutional syphilis, and in twenty males half were in the same condition. Thus, out of the total number of ninety-nine patients, fifty-two, or more than half, were syphilitic" (p. 247). This seems also to coincide with the general experience of English surgeons. It is noticeable that in Dr. Mason's table of thirty-one cases of "venereal stricture, fourteen are recorded as having had symptoms of constitutional syphilis, so that his percentage does not vary much from that of Mr. Allingham. Prof. Agnew, of Philadelphia, says that he has cured some very aggravated cases of anal and rectal ulceration under the use of the iodide of potassium, or of one of the preparations of mercury, or of both combined.*

The following summary, by M. E. Vidal,† represents the general opinion of French surgeons as to the pathology of the rectum in reference to the venereal diseases, and also, as far as they are represented by Esmarch and Bardeleben, of the surgeons of Germany: "The rectum may be the seat of soft chancre (chancroid), of phagedænic soft chancre, and very, very rarely, of true syphilitic chancre; of tertiary syphilitic ulcers; of gummy tumors; and finally of ano-rectal syphiloma, if we agree with Fournier that this syphilitic neoplasm differs from true gumma."

For a full comprehension of this obscure subject, it is necessary that your attention should be called to the fact that in certain cases where the syphilitic diathesis is present, but without any obvious symptoms of active disease, a simple traumatism, or an ordinary furuncle, may in certain cases, during the process of repair, take an unhealthy as-

* Principles and Practice of Surgery, Phila., 1873, vol. i, p. 427.

† *Dict. Encyc., Art. Rectum, ut supra.*

pect, and assume the characteristics of a syphilitic ulcer. Thus, on the external integument, the healing of the lesion is retarded, the resulting ulcer assumes a circular shape, and its discharge becomes glairy; and after healing is at length accomplished, a white, smooth, depressed circular cicatrix peculiar to syphilis is left, and this most likely becomes surrounded by a ring of pigment. Tarnowsky* has proposed to utilize this fact to demonstrate the existence of the diathesis when other evidence is wanting. I have seen instances that certainly confirm its occasional value. In this way a simple traumatism of the rectal mucous membrane might take on a syphilitic character. A certain degraded quality of the tissues, diminishing their power of resisting injuries, and also their capacity for repair, is pretty certainly present, as a rule, in the syphilitic diathesis; and this must be recognized as a factor in the causation of rectal ulcer, and consequently of stricture.†

At the anus, secondary syphilitic ulcerations may occur, as elsewhere on the surface of the body; but they are not seen so often in this locality as tertiary ulcers.

* "The nature of syphilis," 1877, V. *résumé* by Keyes in *Arch. of Dermatology*, New York, Jan., 1879, p. 82.

† In a case related in the excellent essay of Godebert (*sur les rétrécissements syphilitiques du rectum. Thèse inaugurale*, Paris, 1873), which bears all the marks of authenticity, this explanation of the occurrence of the rectal ulceration may be applicable. M. G. was called to see a young married lady, who suffered great pain in the sexual act. He discovered a hard chancre, quite prominent from induration, situated behind the meatus. She was at once put upon mercurial treatment, but had a well marked roseola three weeks later. The treatment had been carried out five months when she became pregnant, and with a month's intermission, it was continued two months longer. Some coffee colored spots appeared on the chest during pregnancy. After her confinement, at full term, she was excessively costive, going two weeks without relief, and then having a succession of painful stools. Soon after this she noticed a bloody discharge from the anus, and afterwards a purulent discharge that stained her linen. On examination, eighteen months from the first detection of the chancre, the anus was found perfectly healthy; the finger *in recto* detected no hardening but a granular surface painful to the touch, toward the vagina, which the speculum shewed to be an ulcer commencing half an inch above the verge, growing larger as it ascended, and above the sphincter tending to spread laterally on either side. It was treated by the proto-iodide of mercury internally, and locally by iodoform on *mèches* of lint, with improvement.

If the ulceration in this case was not provoked, in tissues of degraded quality, by violence inflicted in the act of parturition, it may possibly have originated in mucous patches excited to ulceration by the same traumatism.

6. *Cancer*, as a cause of ulcer of the rectum, interests us at present only so far as to be able to recognize its presence; and even its diagnosis will be more profitably considered hereafter when we come to study that disease. A knowledge of the causes we have already discussed will justify a diagnosis by way of exclusion. Except in certain aggravated forms of venereal ulceration, or of "malignant" scrofula, you will find no great difficulty in distinguishing a cancerous ulcer from any of those of which I have spoken.

In continuation of what has been said, under each of the foregoing ætiological heads, concerning the symptoms of ulcer of the rectum and anus, I will next proceed to sum up this division of the subject.

The *symptoms* of ulceration in the rectum are: frequent desire to go to stool, with loose passages—what would be usually regarded as diarrhœa; or, a constant uneasy feeling in the rectum with a sensation of weight over the sacrum extending to the loins, and, when relief is sought at stool, more or less tenesmus and discharge of bloody pus and mucus smearing the fæces,—a group of symptoms very likely to be ascribed to dysentery. Allingham describes the looseness of bowels accompanying ulcer as occurring mainly in the morning. In Annandale's case of the Indian medical officer this circumstance is not noted, but the case was called both diarrhœa and dysentery during the three years which elapsed before a surgical exploration proved it to be neither, but simply a solitary small ulcer.

The frequent stools in this affection are excited by the contact of fæces with the sensitive spot in the rectum; the same cause of irritation provokes increased watery secretions and blood exudes from the raw surface under the muscular compression that attends the act of defecation. The patient voids the usual amount of normal fæces, but besides this—either accompanying it, or alone,—he passes, also, these products of the local lesion.

There is often, in ulcer, acute pain, and a more or less constant sense of exquisite soreness referred to the rectum. When the ulcer extends within the grasp of the sphincters the pain is intensified, especially at stool, and liable to be accompanied in some degree by the spasm of fissure; but it must be remembered that there are exceptional cases in which it is faint, or even entirely absent. In such cases the looseness, which may occur only at the period in the day when the functions of the rectum are usually performed, will constitute the only symptom of the disease. In the ulceration preceding syphilitic strictures, which according to Fournier is exceptional in its occurrence, the characteristic purulent discharge from the anus is often accompanied by little or no pain.

Occasionally in ulcer of the rectum there is sympathetic irritability of the bladder, of which I have a case now under observation.

The *prognosis* of rectal or anal ulcer, except where it has followed a recent traumatism on a healthy subject, is serious, and may involve life. There is danger of its simple persistence in a chronic form with exhausting pain and disturbance of the functions of the bowels; of extension on the surface, or in depth, especially where an unextinguished local virus or a constitutional diathesis—scrofulous, or syphilitic—is present; of perforation with the consequences of abscess—possibly stercoraceous, and of fistula—if below the reflexion of the peritonæum,—otherwise of fatal peritonitis.* In proportion to the extent of the ulceration there is danger, when it heals, of stricture of the canal from the contraction which invariably attends cicatrization; and this danger, because its seat is hidden and its consequences

* Mr. Henry Lee says (Lectures on Pract. Path. and Surg. London, 1870. Vol. i, p. 156), that a perforating ulcer of the rectum most commonly results in a blind internal fistula, but that it may prove the source of a "diffuse cellular inflammation" by stercoraceous extravasation—like urinary extravasation, and leading, like the latter, to incisions of perinæum, pubes, scrotum and penis.

somewhat remote, is liable to be underrated. There are few instances, therefore, in which this affection does not demand prompt and judicious care.

Under the head of *diagnosis*, I must repeat that "fissure or irritable ulcer of the anus" is not included in the present category; its characteristic and excessive pain from spasm of the sphincter is rarely, if ever, encountered in the form of ulcer now under consideration. Here the pain is rather described as aching, wearing and continuous, but not characterized by paroxysms; and, as a rule, it is attended by spasm only in the exceptional instances in which the ulcer invades the portion of the rectum grasped by the external sphincter.

A case of persistent "diarrhœa" or "dysentery," accompanied by a constant pain or uneasiness over the sacrum, or a sense of weight in the loins, that resists ordinary remedies, should be examined for ulcer, especially when the disturbance of the bowels is confined to the early part of the day. The cases are rare in which satisfactory evidence can be got of the existence of rectal ulcer by sight on pulling apart the margins of the anus, and digital examination cannot always be trusted. A thorough exploration under ether is the course to be adopted. Ulcerated piles are not uncommonly found, but they require the radical treatment for hæmorrhoids, not for ulcer. As a rule, the symptoms caused by ulcer are more marked the nearer it is to the anus. A tubercular ulcer in healing produces an irregular bridled cicatrix, as in the neck of a young person. Where chancroid is suspected, inoculation should always be practiced. Tertiary ulcers at the anus, as when they occur upon the genitals, are often distinguished with difficulty from chancroid. There seems to be no certain test but inoculation, and this has been generally neglected. Nevertheless, to the practiced eye there is a physiognomy pre-

sented by the anal wrinkles, thickened by infiltration, with the elongated ulcers between them, called by the French *rhagades*, which is unmistakably syphilitic; and it is worthy of notice that these fissure-like syphilitic ulcers, although in their nature persistent and painful, rarely, if ever, assume the characteristics, especially the peculiar and intolerable pain of the true irritable ulcer, *i.e.*, they do not excite spasm of the sphincter to anything like the same degree, and are not properly treated by the same remedies.

Treatment.—The remedies which have proved most valuable in the treatment of anal and rectal ulceration are those which secure rest and protection from irritants locally, and tend to remove constitutional defects and improve the health generally. Cleanliness, and means to obviate friction, of which prepared cotton wool and vaseline are the type, are required at the anus, or a more stimulating antiseptic like the balsam of Peru, or the latter rubbed up with vaseline in proportion of gm. 4–8 to gm. 32 (3 j—3 ij to 5 j). For secondary syphilitic ulceration at the anus, calomel in powder, alternating with a weak lotion of chlorinated soda—gm. 30 to 500 (5 j to Oj), black or yellow wash; and mercury or mixed treatment, internally. For tertiary ulcers, calomel, locally, with vaseline or Peruvian ointment, or added to the benzoated zinc ointment, and the iodide of potassium internally. For chancroidal ulcers of the anus, where destruction by nitric acid is not admissible, extreme cleanliness, iodoform, persulphate of iron. For scrofulous ulcers, externally, more decided stimulants are required, such as alcoholic lotions, tincture of iodine, Juniper tar soap, oakum, with the hypophosphites or cod-liver oil internally, and change of air.

For ulcers of the rectum, local applications are, to say the least, inefficient. Nitrate of silver may temporarily re-

lieve painful sensations, and other stimulating alteratives and astringents, as advised by most writers, may do service at the moment, but the difficulty and annoyance that attend their frequent application by the aid of a speculum render a reliance upon them an uncertain and routine practice that I can hardly recommend. Small injections, gm. 60 to 120 (℥ ij to ℥ iv) of bismuth rubbed up with gum and some anodyne, thrown up after stool, I have seen do service in mitigating pain and delaying the calls, and also the insertion of a suppository containing two grains of subsulphate of iron, or of tannin. Any similar medication, in either of these last mentioned forms, may be repeated by the patient, after proper instruction, with but little trouble.

The basis of treatment of ulcer of the rectum consists in so modifying the diet as to render the fæcal residue bland and unirritating, and this is best attained by confining the patient to a diet of rice, or bread and milk, or still better of milk alone. I have heard it said that the late Dr. Physick was in the habit of confining patients with obstinate rectal affections to a diet of rye mush and molasses, and also to the bed for six weeks. There is probably no one remedial measure of greater value in rectal ulceration than this simple diet. I have seen results, in the least hopeful cases of rectal disease, from the milk cure associated with country air in the neighborhood of the sea-shore, which seemed to me to justify great confidence in its value. To the dietetic remedy rest in the horizontal position is a necessary adjunct, for the mobility of the super-incumbent mass of intestines is a constant source of friction to the rectum.

Judicious perseverance in these simple measures will generally cure an ordinary case of ulcer of the rectum if undertaken early, and they rarely fail to modify favorably cases of the most serious character.

Upon this basis other means, if they prove necessary, may

be added, and the most effectual of these is incision of the ulcer and simultaneous division of the sphincters. The object of this operation, which has the sanction of the best practical authorities, is to place the ulcer entirely at rest by dividing the fibres of the underlying unstriped muscles deeply enough to effect the object without endangering perforation. The free division of the sphincters at the same time has the effect of suspending, as far as they influence the ulcer, the series of forcible contractions of the whole muscular apparatus by which the expulsive function of the rectum is accomplished. Incision, where the area of the ulcer is moderate in extent, that is when it does not exceed a half-dollar in size, will almost certainly arrest the symptoms of the disease and start the healing process, which, under favorable circumstances, will go on to an entire cure. But even here there are exceptions, although I have not seen them. In the case of Mr. Annandale it was necessary at the end of a month, in consequence of the arrest of cicatrization, to draw a knife a second time across the face of the ulcer, which it will be remembered was of three years standing; after this it healed promptly.

Where the rectal ulcer presents a larger area, and shows a disposition to refuse to heal, or to increase in defiance of all treatment, and in those grave cases of extensive and intractable ulceration, encountered most frequently in hospital patients, where the suffering at stool is severe, and the ulceration, although not cancerous, is apparently incurable by other means, it is proper to consider colotomy as a remedial measure. The very moderate danger to life of this operation, and the numerous instances now on record in which it has been followed by permanent cure in most unpromising cases, make it the surgeon's duty to give his patient the chances of cure which it certainly affords. In Dr. Bridge's case, already cited, the woman was rescued

from a most deplorable condition, and left the hospital well. In the more recent and equally hopeless case colotomized at the New York Hospital by my colleague, Dr. Weir, its result in entire cure of the rectal ulceration was verified on post mortem examination by Dr. L. A. Stimson after the patient's death from phthisis in Bellevue Hospital some time afterwards.*

* This woman was a music teacher of bad habits who entered the New York Hospital suffering greatly from stricture of rectum within reach of the finger, complicated with ulceration. She gave a history of a sore near the genitals five years before, which had slowly and gradually extended to the anus, and through it up into the gut. She was undoubtedly syphilitic. Since the formation of the stricture she had been subjected, according to her account, to linear rectotomy, and had also undergone anti-syphilitic treatment without benefit. On examination a good deal of unhealed ulceration was found co-existing with the stricture in the rectum, that at the anus having healed. For the ulceration colotomy was performed. Eight months later this woman entered Bellevue Hospital with phthisis, and after some weeks died. At the autopsy the rectum was removed and carefully examined by Prof. Stimson. It presented a smooth cicatrix, and no very noticeable amount of stricture. The artificial anus had evidently done good service. As the body lay on the table in the dead-house, there was a protrusion of at least six inches of healthy descending colon from the lumbar opening.

R. C., 3), single; seen in consultation with Prof. Stimson at the Presbyterian Hospital in Feb., 1878, with an irregular surface ulceration the size of a dollar on the posterior wall of rectum, and a recognizable amount of semi-annular contraction from cicatrization on the left side of the gut about two inches up. There was a history of dysentery in the autumn of 1876; beyond this no cause was made out, although the man was suspected of malingering. He complained of more or less uneasiness and of frequent stools, at which blood and pus were passed. He was put on milk diet, nitrate of silver was applied locally, and subsequently iodoform, and he wore Lepelletier's plug. After some months this patient was again examined as before under ether, and the ulcer was entirely healed, with slight contraction. This man, as I learn, returned again to the hospital complaining of his rectum, and passing pus, and in March, 1879, was subjected to lumbar colotomy by Prof. Post.

I saw also a young married woman of 24, in consultation with Prof. Stimson, who had a smooth, irregularly shaped ulcer entirely above the sphincter, as large as a half dollar, on the left lateral and anterior wall, and two smaller ones posteriorly, which gave her some uneasiness, and caused too frequent stools, which were attended by bleeding, sometimes profuse. This woman, who was otherwise quite healthy, had borne children—one very difficult labor, and had been under treatment for uterine disease; she was separated from her husband. No distinct cause was made out for the ulcer, which was uniformly red, with but slight elevation of its edges. It was touched with nitrate of silver, and several times with tannic acid. She also had her sphincter stretched subsequently, and wore Lepelletier's plug; and, as I am informed, was cured entirely in about two months.

HINTS FOR INVALIDS VISITING SOUTHERN HEALTH RESORTS.

BY W. H. GEDDINGS, M.D., OF AIKEN, S. C.

THE busy practitioner orders a patient to pass the winter in the South, tells him he is to remain a certain length of time, and may prescribe a given course of treatment. No directions are given in regard to the exposure of the room he is to occupy, the kind of clothing he is to provide himself with, the amount of exercise he is to take, and many other details so essential to the well-being of the patient; and yet it is upon attention to such little matters as these that the success of the trip depends; and no plan of treatment, be it ever so carefully devised, will be beneficial without them. A few years ago a physician in New York, a man of good standing in his profession, who had spent several years studying in Europe, sent two ladies to winter in Aiken, advising them to take nothing with them in the way of wearing apparel other than their usual summer clothing. This in latitude 33.32°, where in midwinter occasional snaps of cold weather are of course of not infrequent occurrence.

A residence of ten years at large health resorts in this country as well as in Europe, and a professional life devoted exclusively to the treatment of travelling invalids, has im-

pressed upon me the necessity of publishing a few short hints, which, while serving as a guide to the inexperienced, may also tend to direct the attention of the profession at large to details that are only too apt to be overlooked.

PREPARATIONS FOR THE JOURNEY.

Outfit.—Persons intending to pass the winter in the South should at once be disabused of the idea that they are going to a land of perpetual summer. The winter there is, it is true, very short, but there are days when he will feel the cold fully as sensibly as in the North, and it is important that invalids should be provided with clothing but little lighter than that which would be required at home. The houses in all southern countries being lightly built, are somewhat difficult to heat, so that a comparatively slight fall of temperature is apt to cause the new-comer some discomfort. I would here advise all invalids going South to avoid the so-called *chest protectors*. They are too heavy for the climate of that section, and on warm days become so saturated with perspiration and other cutaneous secretions as to become offensive to the patient and those around him. Once put on, their removal is attended with great risk, and they must in most cases be worn for the remainder of the season and the following spring. Similar objections apply to the popular porous plasters, but not to the same extent. On one occasion I was called to a young man suffering from what was supposed to be hectic fever, but whose general appearance did not correspond with that condition. On attempting to make a physical examination, I was so overpowered with a sickening stench emanating from his chest, that I was compelled to desist. On inquiry, I discovered that after rubbing the walls of the thorax with croton oil, he had covered them with porous plasters, wearing over both a thickly padded chest protector of chamois skin. After the removal of the plaster and “protector” and a thorough cleansing of

the skin, the fever, which was solely due to the suppuration under the former, disappeared at once, and the patient rapidly improved. They are both of them, to say the least of doubtful utility, and all the good they accomplish may readily be attained by the use of warm flannel and mild counter-irritants.

Light clothing should be taken for spring use, but the patient should be cautioned not to change the character of his clothing without first consulting the local practitioner. The warm days of early spring are very treacherous, and I have known serious accidents to arise from the premature laying aside of winter clothing.

In addition to the ordinary clothing a light overcoat or shawl is indispensable, and no invalid should leave the house without one or the other of them. I do not mean that they should be constantly worn, but they should always be at hand to be put on when the invalid stops to rest, or on passing from the bright warm sunshine into the damp chilly shade of the woods.

South of Washington a lunch basket will be found very desirable, for although the railroads are provided with eating-houses, the food is not always of a character to suit a delicate stomach, and in the event of a break-down, or other accidental delay, the traveller may, as once happened to the writer, be obliged to go perhaps twenty-four hours without a morsel of food. If the invalid be at all weak, the basket should contain in addition to ordinary food a good supply of stimulants, one or more bottles of Valentine's meat juice and a small quantity of paregoric or some simple diarrhœa mixture, together with such other remedies as the patient may require on the way.

Unless the invalid proposes going to some very remote locality, it is more than useless for him to burden himself with a lot of medicines. Good drug stores with everything

he may require in the way of medicines are to be met with in most of the leading resorts. Fluid medicines do not make good travelling companions, and I have known the contents of more than one trunk to be seriously damaged by the breaking of a bottle of cod-liver oil, or the breakage of a vial of sulphuric acid.

Travelling Companions.—Pleasant and cheerful society is essential to the well-being of the sick, and no invalid should leave home for any great length of time without the companionship of some friend or relation. We have all experienced the depressing feeling that overcomes us on arriving in some strange place, and if this is the case with well people, how disastrous must be the effect upon him who has been weakened by sickness or suffering. He dwells morbidly on the details of his case, becomes every day more and more discontented and despondent, and often ends by returning home prematurely, thus abandoning that which, but for this single mistake, might have proved of inestimable value to him.

It is not every one, however, who is capable of filling this office, and some companions are worse than none. The escort should be of cheerful disposition, entertaining in conversation but not so voluble as to bore the patient, he should be possessed of sound common sense and good judgment, neither so young as to endanger the welfare of the patient by inexperience or carelessness, nor so old as to be uncongenial to him, he should know how to tell the truth, but in such a manner as to induce his charge to look on the bright rather than on the gloomy side of the picture.

As a general rule mothers and wives are the best companions for an invalid, but a sister or even a daughter if sufficiently experienced, may do equally well. In the absence of any suitable relative a good and trustworthy nurse should be procured from one of the training-schools. The latter

will be found to be of inestimable value even when the invalid is accompanied by some member of his family.

THE JOURNEY, ROUTE, SEA-SICKNESS.

Railway Routes.—Fifteen or twenty years ago, the question whether a patient should go South by sea or by land admitted of but little debate, the great saving in fatigue deciding almost invariably in favor of the former. The inventive genius of our fellow-countrymen, Mr. Pullman, has however changed all this, and the journey South may now be made not only with speed, but with a degree of comfort little dreamed of by the traveller of the last decade. All the lines of railway leading South are now provided with the elegant carriages invented by that gentleman, or in their absence with improvised sleeping cars, which, although not so luxurious in their appointments are preferred by many, the absence of the upper birth affording more breathing space. It is true that the same advantage may be secured in the Pullman car, but this entails an additional expense which many would gladly avoid.

The various railroads leading to southern resorts start out as a rule from Washington, but passengers from Boston, New York, Philadelphia, or Baltimore, may take a Pullman car from either of these places and make the entire journey to Augusta, Ga., or even Savannah without a single change of cars.

One of the most attractive routes is that known as the Central Short Line, which starting from Washington, runs via Lynchburg or Richmond to Danville, and thence through the picturesque Piedmont region of Western South Carolina to Augusta, Ga., the time from New York to the latter place being 30 to 33 hours.

The same point may also be reached by the Atlantic Coast Line, through Richmond and Petersburg to Wilmington, and thence via Columbia or Charleston, to Augusta.

Passengers by the Central Short Line, intending to winter at Aiken, S. C., change cars at Graniteville, seventeen miles east of Augusta and five miles from Aiken.

From Augusta, Ga., there are three routes to the various resorts in Southern Georgia and Florida. 1st. The Magnolia Route, via Yemassee to Savannah, and thence by the Atlantic and Gulf R. R. to Thomasville and Florida. 2d. The same points may be reached by taking the cars from Augusta to Savannah, (Central Ga. R. R.), and thence via Atlantic and Gulf R. R. as above. 3d. Passengers to Eastman and Thomasville may best reach these places by the cars from Augusta to Macon, Ga.

In addition to the rail routes, the well appointed steamers plying between Charleston, Savannah and Palatka, afford comfortable facilities for reaching Jacksonville and the various resorts on the St. John's river. There is also a line of small steamers running between Savannah and the St. John's, by what is known as the "inside" route, a succession of water courses lying between the main land and a series of adjacent islands, a desirable journey for those who wish to avoid the sea-sickness attendant upon the outside passage.

Steamer Routes.—Notwithstanding the many facilities afforded by modern railroads, much may still be said in favor of the sea voyage, especially for those with whom time is no object, and for whom sea-sickness possesses no terrors. It is not only less fatiguing, but owing to the equability of the ocean climate invalids are not so liable to take cold. On leaving the northern points, (I speak now of the New York and Charleston and the New York and Savannah lines) the steamer soon approaches the Gulf Stream, the warmth of which enables the patient even in winter to pass a considerable portion of the day on deck. Aside from the heating influence of the Gulf Stream, the air of the ocean is always relatively warmer than that of the land, from the fact that

the colder and consequently heavier strata of water sink to the bottom, and are replaced by those which are lighter and warmer. The change of climate, owing to the slower progress of the steamer, is much more gradual than when the journey is made by rail and is consequently less trying to the invalid. In addition to all these advantages the invalid secures the beneficial effects of a climate, which since the days of Aretæus has never ceased being lauded for its wonderful efficacy in consumption and other diseases of an asthenic type.

Many pulmonary invalids object to the sea voyage on account of the prevalent, but erroneous idea, that sea-sickness will bring on an attack of hæmoptysis. The writer has had under his observation hundreds of consumptives, who have made the trip from New York to Charleston, but in no case has he ever known a pulmonary hæmorrhage to be induced by sea-sickness. It appears that the nausea preceding the act of vomiting so depresses the force of the circulation as to counteract the straining and retching. Then, too, pulmonary invalids without enjoying absolute immunity, are supposed to be less subject to sea-sickness. The time occupied in making the trip to Charleston is usually from sixty to seventy hours; to Savannah, a few hours longer.

Routes by Sea and Land combined.—Those who wish to make a short sea voyage, but who do not care to round Cape Hatteras, may take the elegant steamers of the Old Dominion Line, which ply several times a week between New York and Norfolk. Arriving at the latter place the passenger crosses to Portsmouth where he takes the cars for Wilmington, (Atlantic Coast Line). The Bay Line is one of the most comfortable of the southern routes. Arriving at Baltimore in the afternoon or evening, the traveler goes on board of a fine steamer, which in its appointments is but little inferior to the celebrated Sound and Hudson River boats,

enjoys a good night's rest on Chesapeak Bay, and lands the next morning at Portsmouth. Not the least of the advantages of this route is the excellent restaurant attached to each boat.

WHEN TO GO SOUTH.

The time of departure will depend in a great measure upon the destination of the invalid and the object of the journey. If it is intended that he should pass the winter at Aiken, he should, if he desires to receive the full benefit of the climate, arrive there some time in October or early in November, not so much because these are the pleasantest months in the year, as that by an early start the risks of the journey are materially lessened.

Patients and physicians are only too prone to regard the South as merely a place of refuge during the colder months of winter and spring and lose sight of the fact that but little impression can be made upon a chronic disease by a change of climate for a few weeks or a couple of months. To derive any permanent advantage from such a change requires in most instances a residence of many months, and in cases of consumption it is only by a return for several seasons in succession that a cure can be effected. Should Southern Georgia or Florida be the destination of the patient, the start should either be made later or he should be prepared to pass the months of October and November in Aiken or in some other intermediate station. The physician should always choose the proper resort for the invalid and not leave it to the judgment of the latter, or worse still, send him South with vague directions to try a certain place, and in the event of his growing tired of it, to change to another. The South is a vast section embracing many varieties of climate, each of which is specially adapted to certain diseases, and to give the invalid the range of all the Southern climate is about as rational as to introduce him into a

drug-store and allow him the choice of its contents. The progress of chronic diseases is naturally slow, and the patient failing to derive as much benefit from the change as his rather sanguine expectations had led him to expect, soon becomes impatient and clamors to go elsewhere; and it is here that the health resort physician requires the assistance and support of the family practitioner, and the latter should carefully refrain from sanctioning any change until after consultation with the temporary attendant, he has convinced himself of its propriety.

WHEN TO RETURN.

Here also much will depend upon the nature of each individual case and the latitude of the resort in which the patient has passed the winter. In the case of pulmonary invalids, who constitute by far the greater majority of those who go South, the opinion is almost universal that it is unsafe for them to return to New York before June 1st. while those from Boston should remain even later. Invalids from Philadelphia, Washington and Baltimore may be allowed to return a few weeks earlier. Patients from Florida and Southern Georgia should make their way North by slow stages, leaving the more Southern resorts as the heat of the spring begins to be oppressive, and stopping at Aiken and other eligible intermediate stations, avoiding as far as possible any prolonged residence in the larger cities. I know of no better guide than the advice of the late Dr. Moreland to follow the strawberries. Unfortunately the number of intermediate stations is quite limited, Aiken and Kitral Springs being the only two of which the writer has any knowledge. The latter place is however removed from the direct line of travel. High Point, a little village south of Greensboro is well located, but is wanting in proper accommodation for invalids. It is rumored that a comfortable hotel will soon be built there, in which event High Point would make an

admirable transition station for invalids on their way North. I quote in this connection a few lines from Dr. Lente's valuable pamphlet, *Constituents of Climate*.

"The warning has been repeated again and again by all writers on climate, 'Don't go home too early.' But still the fatal mistake continues to be made, and the sacrifices and benefits of a whole winter are often thrown away by a premature return in the spring. Quite a long spell of warm weather which characterizes our treacherous Northern climate, when the grass becomes green and the early flowers put forth their petals, and the birds begin to sing, beguiles the invalid or his friends who long to see him among them again, into the belief that an early summer is at hand, and he hastens away from his safe retreat, to be greeted on his arrival with a cold and chilling blast, not seldom with sleet and snow, and to experience weeks of weather more dangerous than that of mid-winter. This was the writer's experience of May last: Better remain at home all winter than return too early in spring."

Old and experienced invalids come earlier and stay later.

This impatience on the part of invalids to get home is not confined to our Southern resorts, the same complaints being made at Mentone and other attractive stations on the Riviera. Not infrequently the weather in April becomes even at Aiken quite oppressive, and the unwary invalid, believing that this is only a foretaste of what he has to expect, becomes alarmed and starts for home. In the south the summer approaches not abruptly but intermittingly. A few warm days are succeeded by a storm which cools the atmosphere. Then it gradually grows warm again, these cycles repeating themselves until the summer heat is firmly established. I have often had invalids remain in Aiken with advantage until June 1st.

ESTABLISHMENT.

Selection of Rooms.—Open Fire-places.—No patient should be sent South unless consigned to the care of one of the resident physicians at the place of destination, and in the selection of apartments his advice is of inestimable value. He is conversant with the topography and climatic peculiarities of the place; he knows which houses are the most comfortable, whether the food is of good quality and properly prepared, and last, but not least, he of all persons has exceptional opportunities of discovering the existence of contagious diseases, a matter of great importance if there are children in the party.

The patient's apartments should, if practicable, be located on the first floor, but not immediately above the ground, the most desirable room, except in rare instances, will be the one having windows looking to the south and east. A room so located gets the sun early in the morning and retains it during the greater part of the day. Failing to secure rooms with this exposure, the next best are those looking to the south and west. Southern houses are usually lightly built, and consequently difficult to heat, and on that account a room of medium size is preferable in winter to one of larger size. This, of course, does not apply to the larger hotels, the halls of which are usually heated with steam. The room occupied by the invalid should always be provided with an open fire-place, and care should be taken to ascertain that it does not smoke. It not only serves as a heater, but at the same time a perfect ventilator. Dr. Donaldson * pertinently remarks that "while we ventilate we must warm. By open fires we do both, and healthfully. The aspirating action of the winds produces upward currents of air through the chimneys, and air is drawn in to supply the partial

* Frank Donaldson, M.D. House air the cause and promoter of disease. Reprint from Report of the Maryland State Board of Health, p. 26. Baltimore.

vacuum. * * * *Open fire-places should be in all rooms, especially where there are sick people, even when otherwise heated.*" In making my daily rounds through the hotels and boarding-houses of Aiken, where most of the rooms are provided with open fire-places, I never observe during the colder months that sickening smell so common in furnace or stove-heated rooms when occupied by invalids. No matter how early the visit is made, the air is always pure. In the spring of the year, when the increasing heat of the season does away with the necessity for fires, the case is quite different, and unless the windows are partially opened the occupant is liable to suffer from the deleterious effects of rebreathing air not only deficient in oxygen, but in many instances also impregnated with the filthy exhalations of disintegrating lung tissue. To some all this may appear a matter of small moment, but to the writer, who for ten years has witnessed the good effects of those open fire-places, it is one of paramount importance. They constitute one of the chief advantages of a winter residence in the South, second only to that of being able to pass the greater portion of the day in the open air.

Persons accustomed to the close, overheated rooms of the North, frequently complain of the thin walls and loosely-fitting windows of the Southern houses, but the latter are, in a sanitary point of view, with all their imperfections, the more preferable of the two. The residents seldom experience any discomfort from the cold, and visitors soon habituate themselves to it. The writer above quoted remarks in this connection that "the weather-strips, as they are called, used to prevent air from entering around the sashes, ought be prohibited by law." If an invalid is as thin-blooded as to be chilled in a room properly heated with an open fire-place, he is already too sick to derive benefit from change of climate, and if sent anywhere it should be to Nassau or to some place in the tropics.

MODE OF LIFE.

Amusements.—Exercise.—The invalid day, or *journée médicale*, as it is called by our Gallic *confrères*, comprises that portion of the twenty-four hours that a patient at a health resort is expected to pass out of doors. It of course varies with the latitude of the resort, the amount of moisture present in the air, the season of the year and the character of the prevailing weather. In places as far north as Aiken, it comprises from October to December, the hours between 9 A. M. and 4 P. M.; in mid-winter from 11 A. M. to 3 P. M.; while, as the spring advances, the period may gradually be prolonged with the increasing length of the days until, in the month of May, it may with safety be extended over the time that the sun remains above the horizon. Some of the best results achieved in climato-therapy, according to the writer's experience, were at Gleichenberg, in Styria, where the invalid rose with the sun and retired very soon after dark. He ate and drank in the open air, and even the theatre was without a cover, the amusements were all of an out-door character, while dancing and the assembly of patients in halls were invariably discountenanced by the medical staff. This, however, was at a summer resort, and although the same general principle should hold good, the difference in season and climate would with us necessitate some modification in the pastimes and occupation of the invalid at a southern winter resort, much depending upon the measure of his strength, the state of his blood and the activity of its circulation. One in the first stages of pulmonary phthisis would, of course, be less sensitive to the action of cold than another in whose case emaciation is far advanced, and where great impoverishment of the blood has taken place.

The early hours of the invalid day should be devoted to walking, and as the sun's heat increases, he may sit in the

open air passing the time with reading, fancy work or conversation. Later in the day he should ride or drive out, selecting in winter those roads which lead through pine forests, which, in addition to being warmer and more sheltered from the wind, are supposed by many to exercise some specific curative influence upon bronchial catarrhs, not to mention the theory recently advanced that the exhalations of these trees are capable of generating large amounts of ozone. The rolling chair so much in vogue at European watering places, but as yet unfortunately little used in this country, affords gentle and agreeable exercise to those who are too feeble to take long drives, or who have a disinclination to that species of conveyance. These and the sedan chair should be introduced at all our resorts.

When weary of walking and driving, the patient may find a pleasant and congenial pastime in the games of croquet, lawn tennis, archery, or any other amusement that keeps him in the open air. Dancing, theatricals, and lectures in badly ventilated halls, are to be discouraged, and even attendance at church must be indulged in with great caution, many of these buildings being either so overheated as to make the transition to the outer air dangerously abrupt, or else they are so cold that the invalid becomes thoroughly chilled before the termination of the service.

That horseback riding in moderation is in many cases both desirable and beneficial is generally acknowledged, but it is an equally well-established fact that it is frequently overdone and that in some cases it is liable to lead to disastrous consequences. Scarcely a season passes without my being called to attend one or more cases of pulmonary hæmorrhage brought on by too violent exercise of this character. This, as well as bowling, should not be indulged in without the sanction of an intelligent physician.

The indisputable fact that many young men affected

with phthisis recovered during the campaigns of the late war, and the good results often obtained by a journey across the plains frequently induces physicians to advise their patients wintering in the South to undertake extensive expeditions for the purpose of fishing and hunting. Experience at the South is, however, not altogether in favor of this mode of life, and while willing to admit the good effects arising from continuous residence in the open air, and that it serves to direct the attention of the invalid from his ailment, it appears to me that these advantages, great as they are, may sometimes be more than counterbalanced by the injurious effects of improper and badly prepared food, impure water, over-fatigue, and the ever present risk of poisoning the system with malaria. Cases of obstinate intermittent fever and of bowel affections are such frequent consequences of these expeditions that it behooves us to exercise great caution in recommending them.

THE NECESSITY FOR MEDICAL SUPERVISION AT HEALTH RESORTS.

The remote situation of most of our southern resorts, located as many of them are in a sparsely populated and impoverished country, naturally suggests the absence of skilled medical advice, and the family physician not unfrequently concludes that it would be better for his patient to dispense altogether with medical attendance rather than risk the chances of his falling into the hands of an ignorant and incompetent practitioner. Whatever of justice may in former years have attached to this conclusion, has long since been dissipated. On the principle of the demand regulating the supply, the annual influx of visitors has induced men of acknowledged ability in their profession to pass the winter at these resorts, and there are now but few of them that are not provided with competent medical men, who year by year become more and more accustomed to the treatment of the peculiar class of in-

valids they are called upon to attend. I say peculiar, because the practice of the health resort physician differs in many respects from that of the family attendant, who, through long and intimate acquaintance, is thoroughly cognizant of the mental as well as physical idiosyncracies of his patients. With the physician at a health resort, the case is entirely different: he is constantly called to people who are perfect strangers to him, and to gain their confidence requires an amount of tact that can only be acquired by long experience. Each resort has its own peculiar *clientèle*, and the constant recurrence of the same class of cases makes the physician more or less of a specialist, thus possibly increasing his fitness for the position he occupies. He is necessarily better acquainted with the peculiarities of the climate in which he lives than the home physician, and therefore more competent to advise the patient as to his mode of life, what precautions to observe to guard against endemic diseases, when to remove to another resort, and when to return home.

I am often told by an invalid that his physician has advised him to throw away all medicines and to rely entirely upon the air for his cure, a piece of advice, which aside from its palpable absurdity, is often fraught with the most serious consequences to the patient. A diarrhœa is neglected, profuse coliquative sweats remain unchecked, or the patient may be allowed to waste away with hectic, any and all of which might perhaps have been remedied by timely and judicious treatment. The physician who gives his patient such advice forgets that climate, notwithstanding its manifold good effects, is after all but one agent in the treatment of disease, and is like one who, having charge of a case of typhoid fever, confines his efforts to the reduction of temperature to the neglect of food, stimulants and other useful procedures. Let such remember the oft-quoted

remark of the late and much lamented Niemeyer, that "to attain good results in consumption, it is necessary that the patient should be placed under the supervision of a strict and conscientious physician." No one, be he ever so skillful, can treat a case miles away without assuming grave responsibilities: whatever plan of treatment may at the outset have appeared to be indicated, must necessarily, in the course of time, be modified, either by the progress of the disease or by events which no human foresight could anticipate. Before sending a patient from home, the physician should, where practicable, communicate with the medical man at the place of destination, and enquire whether in the opinion of the latter the climate is indicated in that individual case, and thus perhaps avoid the serious mistake of sending the invalid to the wrong resort. The patient should always be provided with a more or less complete history of the case, giving the treatment hitherto pursued, together with such suggestions to its future conduct as the physician may deem advisable. We have already suggested the propriety of consulting with the resident physician as to the choice of the patient's place of abode, and obtaining from him such other information as may be conducive to his comfort and well-being.

I have dwelt somewhat at length upon these topics, but not longer, I trust, than their great importance demands. No one, unless he has resided for some time at a health resort, can form any adequate idea of the serious mistakes that are constantly made by invalids, and it was chiefly with a view of preventing their recurrence that this paper has been prepared.

THE HYSTERICAL ELEMENT IN ORTHOPÆDIC SURGERY.*

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THERE are two important systems involved in the process of acute local inflammation, namely, the vascular and the nervous. The pathological changes wrought through the operations of the one and the contributive influence of the other in forming the group of symptoms which characterize this condition, need no comment. A typical, local, acute inflammation cannot easily be mistaken for any other pathological state. As we descend in the scale and pass to a study of the sub-acute local lesions, we find that the difficulties in the way of diagnosing this condition are not materially increased. But in the first stage of certain chronic diseases we lose many of the symptoms by which the local, as well as the general, evidences of inflammation are recognized and, aside from the length of time which the history of the case may have covered, there are, not infrequently, confusing elements introduced into the etiological and semeiological factors which demand more attention, I think, than has been accorded to them by some of our most eminent teachers.

* Read before the New York Neurological Society, December 1st, 1879.

It would seem that the symptoms that arise from pathological changes, which, whatever be their etiology, affect principally the local, vascular tissues of a part could be easily distinguished from those which find expression through the medium of the peripheral nerves alone. And, so far as the acute local lesions are concerned there should be no difficulty. But many chronic diseases do not present, especially in the first stage, symptoms of any urgency whatever; they are not accompanied by any constitutional disturbance and the insidious progress of the disease is very suggestive of the manner in which the lesion is undermining the tissues involved. In the acute local lesion, the vascular plays the important part, and attention is chiefly directed to it, both as regards symptoms and treatment. On the other hand, in some forms of chronic inflammation, and especially in certain lesions of the articulations, the neural element predominates and the vascular symptoms are, in many cases, not at all apparent. These facts being duly recognized, it becomes clear why so many of the so-called hysterical, surgical cases resemble an insidiously progressive chronic disease; for with chronic inflammation there is always a localized disturbance of function, associated with other symptoms which in many instances are very obscure and of uncertain etiology, while in the hysterical state there is also localized disturbance of function associated with manifestations which possess, in many instances, all the important characteristics of local inflammation.

For many years the effect of the emotions, not only in producing, but also in relieving abnormal states, has been recognized. In Burton's "Anatomy of Melancholy" may be found references to the value of this factor both in diagnosis and treatment. Many other works could be referred to, illustrating this point, with interest and profit. But this is scarcely the occasion for an extended research into the

literature of this subject. Nor will it be of service to attempt an analysis of the relations of the three great nervous centres to the phenomena which are generally described as hysterical. We would rather say with Dr. Reynolds that "the essential fact of Hysteria is in the disturbed balance between the voluntary and involuntary power. Volition is defective; emotional, sensational and reflex activity are in excess, and the distortion may be brought about by the many divers circumstances of age, sex, position, employment,—but the precise nature of the change which is the efficient cause of such distortion, *i.e.*, the primary physical fact in the pathology of Hysteria, has yet to be discovered.*"

Tuke remarks: "We have seen that the influence of the mind upon the body is no transient power; that in health it may exalt the sensory functions, or suspend them altogether; excite the nervous system so as to cause the various forms of convulsive action of the voluntary muscles, or depress it so as to render them powerless; may stimulate or paralyze the muscles of organic life, and the processes of nutrition and secretion;—causing even death.†"

It will not be difficult for us, therefore, to appreciate the effect of emotional activity upon the voluntary muscles. Indeed, all the sensations of which these muscles are capable, all the movements they may be made to undergo in response to the will, may be excited by this emotional cause, or voluntary muscular action may be apparently wholly lost through the same disturbing element. Still more, the various morbid sensations of the surface may be produced. Even superficial vascular changes may be brought about, inducing a local hyperæmia or an ischæmia. With defective volition, an excess of emotion, undue ac-

* A System of Medicine, edited by J. Russell Reynolds, M.D., vol. ii, p. 101.

† Influence of the Mind upon the Body, by Daniel Hack Tuke, M. D., M. R. C. P. p. 395.

tivity of sensation, and an easily excited reflex movement—especially if complicated by precocity in the child, or mental exhaustion in the adult, a long and intricate series of symptoms may follow, including disturbed muscular action, varying from the most extensive and general convulsion to the semi-tetanized muscles of one of the extremities, and from an apparent hemiplegia to the loss of power over a group of flexors. If these facts be appreciated, we can wholly coincide with Tuke when he says that “there is no sensation, whether general or special, excited by agents acting upon the body from without, which cannot be excited also from within by emotional states.”* And to this statement we may add: There is no articular deformity depending upon chronic inflammation or disturbed muscular action—be it either loss of power or contraction—which cannot be simulated, and not unfrequently is simulated in the conditions which I have briefly attempted to describe.

The early writers on diseases of the joints fail to mention the existence of that variety of articular deformity which is associated with a more or less marked hysterical diathesis. Since the time, however, that Brodie called attention to the circumstance that many serious pathological conditions might be closely simulated by the condition which Skey† recognises but does not name, except to call it Hysteria, which Paget‡ more recently describes as Neuromimesis, and which Esmarch§ calls *Gelenkneurose*, the fact that these peculiar disturbances of the nervous system may successfully imitate the more serious deformities has been recognized; though, strange as it may seem, some of the more recent and pretentious works on the subject of joint

* Op. cit. page 146.

† Lectures on Hysteria, New York, 1867.

‡ Clinical Lectures and Essays, New York, 1875.

§ Ueber Gelenkneurosen, Kiel, 1872.

disease and club foot do not even refer to the fact that there are such conditions as hysterical deformities, while others dismiss the matter with only a passing notice.

In very many important respects the false so closely resembles the real disease that even the most experienced are, at times, at loss to decide whether, for instance, a given articulation is in a condition of progressive chronic disease, or simply in a neuromimetic state. Esmarch, after calling attention to the difficulties in diagnosis, relates that for many weeks he was undecided regarding the state of an ankle joint, which ultimately proved to be in a condition of *caries sicca*, and required amputation. Skey's testimony on this point is forcibly stated as follows: "It may be asserted with truth that every part of the human body supplied with nerves—be they cerebral, spinal or ganglionic—may become, under provocation, the seat of local symptoms so closely resembling the real disease to which that part of the body is liable, as to appear identical with it, and the resemblance to which is so perfect as to deceive the best of us." Paget says, after enumerating some of the hysterical conditions:—"And there is scarcely any of these disorders in which the mimicry of real disease is not sometimes so close as to make the diagnosis very difficult."

If these cases were rare they would be regarded as singular phenomena, but their frequency takes them from the list of even infrequent maladies and calls for recognition from all, since each one of us is apt to meet them any day. Brodie makes this remarkable assertion—which Esmarch fully endorses: "I do not hesitate to declare that among the higher classes of society at least four-fifths of the female patients who are commonly supposed to labor under disease of the joints, labor under hysteria and nothing else." Skey, who obtained much of his knowledge of hysteria in St. Bartholomew's Hospital, "includes a large proportion of the lower

classes," and says, "in reference to spinal affections in young persons I unhesitatingly assert that the real disease is not found in a greater proportion than one case in twenty—and even this is a liberal allotment."

My own experience convinces me that neuromimetic joints and spines, and more particularly the latter, are very frequent both in the upper and lower classes, and especially at that age when hysteria is most likely to develop. In other words, I may say that many cases of simulated disease of the articulations are not recognized as such, and it is a fair presumption that some, perhaps many, of the remarkable "cures" of which we hear now and then have been cases which, while presenting all or, at least, the more suggestive symptoms of the lesion, were simply in a state of neuromimesis. And this statement is notably true of the class of charlatans who profess to have, by inheritance or otherwise, the ability to cure these diseases by processes peculiar to themselves.

The cause of these erratic manifestations of the nervous system is very obscure. That it is not "mimicry" in the literal sense of the word is proven by the fact that the majority of my own cases have never had the opportunity to become acquainted with the symptoms of the disease itself. The causes assigned by the patients have been those which are ordinarily looked for in a history of chronic joint disease. A fall, a sprain, or over-exercise in skating or walking, in the majority of cases, forms the occasion for the first manifestation of the symptoms, though, as in the real disease, a history of traumatism is often wanting. After the symptoms once find a local expression, they partake of all the pertinacity and chronicity of joint diseases, and whether the muscular disturbances partake of the character of an intermittent *contraction*, or of the typical hysterical *contracture*; whether the general nervous symptoms are partly held in

subjection by will power alone, or give evidence of functional disturbance by various erratic, emotional or typical hysterical symptoms, the solution of the enigma lies in a familiarity with the natural history and course of the real disease.

I have deemed it best in presenting a few of the cases I have met with, to follow the regional method, to bring out as fully as possible the symptoms, and to compare them with those of the chronic lesions of the joint involved. In following this plan I propose to give a full history of each case,—fuller, perhaps in some instances, than some might think necessary; but as many of the differential points are interwoven with the manner in which the history was developed, I have thought it proper to give a few of the histories practically unabridged. As the knee joint affords an excellent opportunity to study both the real and simulated states, I will present some cases of neuromimesis of this articulations first. We will then consider the hip and spine, and lastly, club foot,—giving comments, differential tables and conclusions in their proper places.

CASE I.—While on a visit to Troy, N. Y., in December, 1876, I was asked by my friend, Dr. W. P. Seymour, to see with him a little girl of 5 years of age, the daughter of a clergyman living near the city, who had been troubled with some very suggestive symptoms affecting the hip and knee joints on the left side—following a fall—and which had existed for several weeks. I was introduced to the patient at dinner, and had the opportunity of watching her as she sat at the table. She was evidently a precocious child, and mentally very active. She had that peculiar complexion which is supposed to be indicative of the strumous habit. I also noted that she had large eyes, with long eyelashes, blueish sclerotic, pale skin, showing the temporal veins very clearly, and a luxuriant growth of hair. These facts, with the characteristic gait and attitude of chronic joint disease, which were noted as she left the table, led me to infer that our patient had some serious chronic inflammation of either the hip or knee.

Indeed, a diagnosis of morbus coxarius had already been made by a prominent surgeon of Albany, who had examined the case a few days prior to my visit; a diagnosis, however, which Dr. Seymour had rejected. After dinner a critical examination of the patient was made. In the standing position there was at once apparent a slight discoloration of the tissues over the knee joint, a marked flexion of the articulation (about 35°), and a perceptible atrophy of the thigh and leg. The patient stood in the attitude characteristic of hip disease, with exaggerated flexion at the knee. Almost the entire weight of the body fell upon the unaffected limb, and there were evident the lowered gluteo-femoral crease, the flattened natis and the tilting downward of the pelvis on the affected side, which makes the limb seem apparently longer, and produces the symptomatic lateral curvature of chronic coxitis. When asked to bend forward to pick up a key from the floor, the patient carried the entire limb, in its deformed position, backward with the pelvis, refusing to bend in the slightest degree either the hip or knee. When the patient walked, little or no motion was apparent at the hip joint, the knee was neither flexed nor extended, and the limp was very marked and characteristic of chronic osteitis of the hip or knee. The patient was now placed in the supine position. It was found that the affected knee joint was slightly warmer than its fellow, and that there was an almost complete obliteration of the fossæ on either side of the patella. There was tenderness on pressure over the condyles of the femur, and below, over the ligamentum patellæ. This tenderness was not present on the opposite side. The limb was then examined as to the passive mobility of the hip and knee joints. When the limb was moved as a whole, with the knee in its acquired position, no muscular rigidity existed at the hip. But if the attempt was made to flex the thigh on the pelvis, at the expense of motion at the knee, a very decided resistance was experienced at the hip. When the attempt was made to flex or extend the knee, it was found to be rigidly held in its deformed position by a very decided muscular contraction, and when a slight degree of force was used, the joint refused to yield, and the patient gave evidence of pain, both by facial expression and orally. The pain was referred to the inner side of the joint. A persistent attempt to flex the leg on the thigh, using a continuous rather than a great degree of force, was followed by a very perceptible, almost audible "click," which, Dr. Seymour remarked, reminded him of the sensation imparted to the hand as a knife blade

passes its half opened position. Motion now, inside of the degree of flexion at which the limb had been habitually held, was free and unaccompanied by pain, but any attempt to extend the limb past its usual stopping point, was met by a decided muscular resistance, and apparently gave pain.

Persisting as before, and using a continuous force, gradually increasing it, and diverting the patient's mind in the meantime by telling her an amusing story, the leg passed the apparent obstruction, again accompanied by the "click." Now, again, we found free movement. These manipulations were repeated many times, and always with the same result. The leg would be arrested, either in flexion or extension, at exactly the same point, and the suggestive "click" would invariably occur as this point was passed. After these manipulations the patient was asked to move about the room. It was found that she could walk better than before. I may remark also that during the examination the patient showed considerable emotion, which did not, however, find expression in tears.

There were no hyperæsthetic spots over the spine. There was no history of masturbation, and the genital organs showed no evidences of irritation. The child had always been mentally over-active for her years, and there was nothing of importance developed in the hereditary history. Her general health had always been good, with the exception of the usual diseases of childhood, which she had always borne well. There was a history of disturbed sleep.

The previous treatment of the case included counter-irritation and almost perfect quiet of the affected limb. What proved to be over anxiety on the part of the parents and friends of the patient, had directed a great deal of attention to the child, who in her emotional condition was, not unnaturally perhaps, not averse to this excess of attention.

Remarks.—The differential diagnosis involved a consideration of three conditions—the hip being excluded, as no positive symptoms of any lesion of this articulation presented. I. An osteitis or chondritis of the knee, following some injury to the cartilage at the time of the accident, and which would account for the "click." II. A chronic synovitis, not involving the bone, but attended with anom-

alous symptoms. III. A neuromimesis. After duly considering these conditions, the last was diagnosed, and, for the following reasons:

1st. A traumatism sufficient to lacerate the cartilage, and cause a mechanical impediment to motion, would have been attended with urgent, acute symptoms. 2dly. An osteitis dependent upon an injury or otherwise, would have been followed by more expressive symptoms, and the muscular rigidity would have been uniformly present, and would have prevented motion in the extremes of flexion and extension—not at a point between these extremes. 3dly. The swelling was subcutaneous, and, as was afterwards proven, due to the effect of the counter irritation, thus eliminating the synovial membrane from implication. 4thly. The pain was demonstrated to be hyperæsthetic, and the heat was inferentially supposed to be a simple, local hyperæmia, due to the counter irritation. As it disappeared in a few days, this supposition seemed correct. 5thly. The child was very emotional during examination, and would permit various movements of the limb when her attention was directed to other matters, which motions she would not allow when her mind was concentrated upon the joint. 6thly. The atrophy was no more than would result from the enforced disuse of the limb for several weeks. 7thly. The limp, attitude, etc., were the result of the position of the joint, which position, though fixed during the day, was modified during sleep, free movement of the articulation being then possible without the “click.”

I have attempted to explain the peculiar “click,” which forms the prominent peculiarity of the case, by supposing it to be due to the reduction of a temporarily displaced tendon, or perhaps to the reduction of a slight subluxation, in either event caused by muscular action. This latter condition I have seen in one other case.

The diagnosis was a surprise to the mother of the patient, for she had been led to infer, upon what we all would esteem good authority, that a serious chronic inflammation of the hip joint existed. Dr. Seymour wholly coincided with me in my opinion. The parents were directed to stop all local treatment, excepting daily manipulation of the joint. The child was not to be asked any questions regarding her knee, and the excess of attention she had received was to be discontinued. The patient's thoughts were to be diverted from herself; plenty of exercise in the open air was insisted on, and a general tonic course of medication was advised. A few months later the mother of the patient called upon me, and stated that for a few weeks only slight improvement was noticed, but that afterward, under the stimulus of a promise that if the patient would walk "perfectly straight" by a certain time she might attend a Sunday-school festival in which she was greatly interested, the improvement became more rapid. She did walk without any limp; there was no pain, and the recovery was complete. There has been no return of the trouble since that date.

This patient exhibited symptoms which would suggest a primary local lesion of the knee joint involving the vascular system, heat, swelling, redness of the cuticle, and pain, following an injury; adding to these, immobility of the articulation, limping, muscular atrophy and disturbed sleep, and all the important symptoms necessary to a diagnosis of chronic disease of the joint were present.

CASE 2.—G. L. R., a boy of 12 years consulted me on November 25, 1878, introduced by letter from a prominent surgeon of western New York. The patient came into my office leaning on the arm of an attendant, limping very badly and complaining greatly of his left knee.

Inquiry developed no tendency to hereditary disease of the articulations, no history of phthisis or rheumatism, and there was

nothing of importance in his early history,—he had always been a healthy, though not a rugged boy.

In February, 1878, the patient fell upon the ice in front of his home, striking upon his knee-joint. The injury was quite severe and the boy was carried into the house. There was great pain, followed by ecchymosis and some heat and swelling. These symptoms continued for a few days, and after their most acute phase subsided, there was more or less pain on moving the joint, with swelling at the point of injury. He remained in bed for five weeks, and for the two or three weeks following he was dressed, but hobbled around saving, in every possible way, the affected joint. Finally, about ten weeks after the injury he walked as well as ever, and during the spring and summer walked to and from school daily, a distance of four miles.

On October 10th, he went on an errand for his mother, and on his return his knee pained him very much and he was obliged to stop walking. After this, he “hopped around,” always holding the leg flexed on the thigh in one position. From October 10th to November 25th, (the day he consulted me), he had not been out of doors, except to come to the city. There had been no acute pain in the joint when it was at rest, but any sudden motion produced “sharp pain:” he had slept tolerably well; there was considerable atrophy of the thigh and the leg muscles and the boy was thin and anæmic and, evidently, very apprehensive about his knee. The joint was held quite rigidly by muscular action in the extremes of flexion and extension, but examination proved that no real muscular spasm existed: the joint could be flexed and extended normally by persistently using a very moderate degree of force, though the attendant states that the position of the leg was not modified during sleep.

The patient gave a history of mental overwork: had studied hard and for several years: tastes had always been effeminate—always very gentle in his play, preferring the society of girls to that of boys of his own age; not emotional as to tears, but is what would be called “a nervous boy.”

Remarks.—My comments on this case will consist simply of extracts from the letter which I sent to the family physician: “I may summarize the results of my examination as follows:—no marked pain on motion which was not limited by any reflex muscular spasm, though the spasm was closely

imitated in the extremes of flexion and extension: no strictly involuntary symptoms at all, either nocturnal or diurnal: no swelling except, perhaps, a very slight one under the ligamentum patellæ, where the thickness of the cuticle (from iodine) made palpation very unsatisfactory: local temperature 2° lower than on opposite side: electrical reaction of muscles of leg and thigh normal, the same on either side: defective nutrition of limb due to disuse solely." * *

"The boy is mentally very acute and physically very sluggish. I find he is inclined to avoid boyish occupations and consider his lack of stamina and pasty complexion to be not of the strumous sort. In some respects our patient is what may be called a typically neurotic boy."

"I would advise a gradual increase in the use of the joint and limb, for a few days passively using electricity, massage, etc., and then I would put the patient on his own resources entirely: he is to be asked no questions as to his feelings or sensations: give also, a thorough course of iron, cod-liver oil and malt, and keep the boy out of school and at out-door sports for at least one year."

The patient wholly recovered in a few weeks and has grown six inches since I saw him.

A diagnosis of chronic joint disease had been made in this case by a prominent surgeon, whose contributions to surgery have more than once been quoted abroad, and this gentleman was about to apply apparatus to the patient, rest and counter irritation having resulted only in an increase of the symptoms.

CASE 3.—Miss K., a young lady of good physique, residing in New Jersey, consulted me in February, 1878, in reference to what were apparently severe and urgent symptoms of disease of the knee joint, the patient presenting herself on crutches.

She gave the following history:—About four years ago she began to have pains occasionally in the left knee: they were very acute, occurred at irregular intervals and were increased by walking. There was no limping at first. The pains came and wen

without any recognized cause and were as frequent at night as by day. She never awoke with pain and was, as a rule, free from it up to 9.30 o'clock, A.M., when it would generally occur: there was never any swelling of the joint which the patient could detect, though it was frequently hotter than the sound one: she was always able to move the joint with more or less freedom though at times with considerable pain: passive motion was accompanied by considerable resistance in the extremes of flexion and extension. After some months the symptoms became worse and the family physician ordered crutches, which the patient has ever since used, without, however, the relief which was anticipated. Accompanying these local symptoms were other manifestations, affecting, especially, the head and neck. The sensations here were those of "trouble in the back of the neck"—pain, not increased by motion, a sensation of heat "like a hot plate," in the cervical region, but no headache. It sometimes happened that when the knee did not ache, the neck did, and *vice versa*. The pain in the knee was not superficial but was referred to the very "centre of the joint." It was either a "gnawing or a lancinating pain:"—there were no hyperæsthetic areas and, at the time of the examination, the local and general temperatures were normal. The patient did not look at all ill, and there were no facial traces of suffering so frequently seen in chronic osteitis of the joint ends: but there was hereditary history of phthisis, the mother having died therefrom. The case had been under the care of one who would be recognized as a competent observer, who, attributing too much weight, in the absence of specific symptoms, to the phthisical history, had made a diagnosis of incipient osteitis of the knee. There were symptoms which suggested this lesion, but like all purely neurotic symptoms, they were extremely irregular and inconstant, and this very element was the basis of an exclusive diagnosis in the case.

The crutches were dispensed with and the patient, who was an indefatigable teacher, was removed from her routine duties. It took the patient five days only to discontinue the crutches, though she had used them continuously for months and had not gone out of the house for the three months preceding Christmas, 1877:—this discontinuance did not produce pain and their absence, after the novelty wore off, was pleasant rather than otherwise. During the past summer the patient has been at the seaside and among the mountains, has used no artificial support whatever, and has returned greatly improved.

I may remark that this case is typical of that kind of "hysteria" which develops in those who are physically robust, but who are subjected in their occupations to constant physical and mental strain. This lady filled an important position in a large school and gave almost incessant attention to her duties. I draw attention to this and, in noting the absence of any history of traumatic influence, to the difference that exists between the simulated joint lesions dependent on mental overwork and strictly emotional cases with the history of traumatism. In the first there are symptoms which find a local expression in other parts of the body, while in Cases 1 and 2, there are first local injuries through which the fear and other emotions of the patient seem to find an exit.

During the fall of 1875 my attention was especially directed by a case which occurred in my service at the Orthopædic Dispensary (Case 4) to the fact—which I had before noted—that the expressive muscular atrophy which occurs in morbus coxarius did not exist in the hysterical state which simulated it. In this particular case a slight atrophy only occurred even after several weeks of treatment which involved complete disuse of the limb and the pressure of adhesive plasters and bandaging, all of which are the necessary accompaniments of the mechanical treatment. This led me to investigate the electrical condition of the muscles in both the hysterical and diseased conditions of the hip joint especially. The result was that in the former I found in all the cases I examined a normal degree of muscular contraction in response to the faradic current, while in the latter, even in the earliest stages, and apparently coincidental with the first appearance of the reflex muscular spasm, there was a marked reduction. After many experiments, including the same tests as applied to voluntarily tetanized muscles, and which showed a normal reaction like the hysterical, and

all of which uniformly led to the same conclusions, I invited my friend, Dr. E. C. Seguin, to apply the same test to several cases of hip joint disease. This he did on May 17, 1877, and the result of my own observations, sustained by Dr. Seguin's experiment, are duly recorded in the *Archives of Clinical Surgery*, for June, 1877. From this article* I may be permitted to quote the following sentences: "The atrophy which occurs from simple functional inertia, combined with the pressure produced by adhesive plaster and bandaging, is witnessed when the not infrequent error is made of treating by these means and an apparatus, a neuromimesis of a joint lesion, for the real disease. This simple atrophy following disuse and pressure is altogether different from that which ensues from an actual joint lesion, and is unaccompanied by a loss of electro-muscular contractility."

These observations were based wholly upon original research, and while, so far as I know, I was the first to apply the electrical test as an aid in the differential diagnosis of true and false joint diseases, it remains for me, as a matter of justice to Charcot and Esmarch, as well as to myself, to state that Charcot mentions that in a case of hysterical contracture "the electrical contractility of the muscles has remained nearly normal," and Esmarch, in his essay on "*Gelenkneurosen*" remarks, "Notwithstanding, the muscles maintain a well nourished condition, and retain after long disuse, their electrical reaction." At the same time I was studying this subject, Dr. Emile Valtat of Paris, was engaged in experimentally demonstrating the muscular atrophy of joint disease† and reached in some respects the same conclusions as my own, as applied to the condition

* Reflex Muscular Contraction and Atrophy in Joint Disease, etc., by Newton M. Shaffer, M.D.

† De l'Atrophie musculaire consécutive aux maladies des articulations, Paris, 1877.

of actual disease. After these statements it becomes unnecessary for me to call attention to the value of the faradic current, as a means of precision, in the diagnosis of the neuromimetic condition.

In Seguin's "Series of American Clinical Lectures,"* I have given parallel tables showing the differential points in diagnosis of typical cases of chronic synovitis and chronic osteitis of the knee joint. I will reproduce them here, make one or two additions to them, and follow them with remarks on the diagnosis of the neuromimetic state, as applied to the same articulation.

CHRONIC SYNOVITIS OF THE
KNEE JOINT.

1. Capsule thickened,—Effusion marked.

2. Natural contour of leg and thigh,—Joint outline obliterated.

3. Motion extensive and nearly normal.

4. Resistance to motion *elastic*, and efforts to overcome it not productive of pain.

5. No reflex muscular spasm present.

6. No pain present, nor produced by forcible tests.

7. No perceptible limp or hesitation in walking.

CHRONIC ARTICULAR OSTEITIS
OF THE KNEE JOINT.

1. No thickening of capsule evident,—No sense of fluctuation.

2. Muscular atrophy marked,—Joint outline clear and distinct,—Joint appears large, on account of the diminished size of both thigh and leg.

3. Motion *nil*.

4. Joint held perfectly rigid by muscular action alone.

5. Reflex muscular spasm affecting both flexors and extensors.

6. Acute pain upon the slightest attempts at joint motion.

7. Unable to walk from pain and deformity.

* The Etiology and Pathology of Chronic Joint Disease. Vol. iii, no. vi.

CHRONIC SYNOVITIS OF THE
KNEE JOINT.

8. Sleep normal,—No reflex osteitic cry.

9. Femur and tibia in normal relation to each other.

10. Symptoms local, so far as those *dependent* on the joint lesion are concerned.

11. The superficial tissues over the joint may be either slightly warmer, or the same as the healthy joint.

12. Electrical contractility of leg and thigh muscles not impaired before the occurrence of the reflex muscular spasm.

CHRONIC ARTICULAR OSTEITIS
OF THE KNEE JOINT.

8. Incoherent cries and "starting pains," occurring during sleep.

9. Tibia subluxated backward (partial) by muscular action.

10. General and local neural symptoms directly referable to the joint lesion.

11. Local temperature rarely lower than normal—almost always increased from $\frac{1}{2}^{\circ}$ to 3° .

12. Electrical contractility of leg and thigh, muscles reduced;—in many cases remarkably so, even in the early stage.

13. The reflex muscular spasm is not modified during sleep—nor does it yield to the ordinary doses of opium or chloral.—It will yield, however, wholly to the profound anæsthesia of ether or chloroform.

We will now consider the various points in this table as applied to the hysterical condition of the same articulation; first, however, calling attention to the fact that in certain conditions a hysterical *contracture* may exist, especially in adults, which more closely resembles the typical reflex spasm of chronic osteitis, than the emotional *contraction*, which I have attempted to describe. This *contracture* will be specially considered later.

1. Thickening over the joint may or may not be present; when present, it is very evidently confined to the cellular tissue only, and is generally accompanied by hyperæmia and hyperæsthetic areas, which latter are not, as a rule, con-

fined to the immediate region of the joint, or to points where tenderness should be developed by pressure either in synovitis or osteitis.

2. Atrophy from disuse only ; not the expressive wasting of chronic osteitis.

3, 4 and 5. The joint may possess even an abnormal degree of mobility, as in hysterical paralysis, but it will generally be found that motion is impeded at first by muscular action, which may either closely resemble the tetanoid spasm of osteitis, holding the joint absolutely rigid at a fixed point, as in Case 1, or it may permit joint movements, which are arrested just inside of the extremes of flexion or extension, as in Cases 2 and 3. In any event persistent effort, in the meantime diverting the patient's attention, will wholly overcome the muscular resistance. If the patient be examined on two or three occasions, the muscular conditions may be found variable, and certain movements which the patient will almost invariably resist under passive examination, will be voluntarily executed when the patient imagines himself unobserved.

6. Pain may be apparently very severe, and at points where it usually exists in osteitis. Generally, however, this pain is just as severe when the subcutaneous tissues are slightly pinched, as when firm pressure is made. In some instances pain can be developed at any point by simply directing the patient's attention to it. The oral expression of pain is wholly different in the hysterical condition from that which occurs in osteitis. In the former it partakes more of the *voluntary* character; the latter is *involuntary*, and is accompanied by a facial expression which cannot be counterfeited.

7. There is always a limp if the limb is used at all. In many cases the fears of the patient, reinforced by the apprehensions of the physician, place the patient on crutches

or in a splint. The limp may closely resemble that of osteitis, or it may partake of the character imparted by congenital dislocation of the hip. If examined with care, however, there will always be found a sort of exaggeration about the gait, and in some cases the patient, under some stimulus, will involuntarily resume command of the hysterical muscles, and walk well for a few moments.

8. Sleep may be disturbed. In the majority of cases, it is normal. An incoherent cry, resembling that of osteitis, occurred at night in one of my cases, but it was evidently due to intestinal irritation. The "starting pains" do not occur in neuromimesis. *Consciousness* is necessary to form the group of symptoms which we are studying now.

9. The position of the limb is, as a rule, flexed—though I have seen it held in extreme extension—a position which Esmarch says is very frequent. At night, during sleep, the malposition may be, almost always, readily overcome.

10. In almost every case the patient will be found to be emotional to a greater or less degree, and there will exist some general or specific evidence of this condition in the history, conduct or appearance of the patient.

11. If the affected joint be hotter, a superficial hyperæmia exists. In Case 1 it did exist, and was apparently due to the counter irritants employed; and yet in Case 2, where counter irritants had been thoroughly used, the local temperature was 2° lower. In two other knee cases, not reported, there was a reduction of 2° in one and $1\frac{1}{2}^{\circ}$ in the other. The hyperæmia of neuromimesis, is apt to disappear and again reappear, while the temperature of an inflamed joint varies but little from day to day.

12. In the hysterical joint, the muscles retain their normal contractility, as tested with the faradic current. Even if the hysteric contraction has existed for a long time, the

faradic current shows little or no reduction either in the muscle or nerve currents.

13. A full dose of opium or chloral will cause the muscular contraction to yield, should it apparently resist in natural sleep.

From these facts it will be seen that all the important symptoms of disease of the knee joint may occur in a neuromimesis. But from a comparison of these differential statements we may draw the following conclusions regarding both the true and false knee joint conditions:

I. The neuromimetic condition resembles both the chronic inflammation of the synovial membrane and the bone. If it be remembered, however, that the changes which take place in chronic synovitis produce very few, if any, subjective symptoms, while the objective are prominent, as applied to the joint itself; and that the hysterical imitation presents a long train of both subjective and objective symptoms and signs, with the former in excess, but little difficulty will be experienced in making a differential diagnosis.

II. If the following conditions exist, a diagnosis of chronic osteitis of the knee-joint may be made with certainty:

1st. A muscular spasm, which cannot be overcome by persistent effort, while the patient's mind is diverted—a spasm that does not vary night or day, whether affecting motion in the extremes of flexion and extension only, or simulating an actual synostosis—a spasm which is not affected by the ordinary doses of opium or chloral, and which yields to profound anæsthesia only. 2dly. A markedly reduced faradic reaction of the muscles thus affected. 3dly. A localized and uniform rise of temperature over the affected articulation. 4thly. The presence of purely *involun-*

tary neural symptoms, as shown above, in the reflex muscular spasm, the starting pain, the osteitic cry, etc.

III. If the following conditions are found, a diagnosis of hysterical knee joint disease may be made with equal certainty: 1st. A variable muscular rigidity or contraction which can be overcome by mildly persistent effort, while the patient's mind is diverted, or which yields during natural sleep, or which wholly disappears under the usual doses of opium or chloral. 2dly. A normal reaction of these contracted muscles in response to the faradic current. 3dly. The absence of a rise of temperature, or especially the presence of a reduced temperature over the affected joint. 4thly. The presence of various emotional and semi-voluntary manifestations, which are variable and inconstant—the variability and inconstancy being due to the different conditions of the emotions, as affected principally by volition.

(TO BE CONTINUED.)

ELEMENTARY LESSONS IN ELECTRICITY.

V.

By A. FLOYD DELAFIELD, A.B.

XI. Induction.—It has been stated that the passage of a current through a wire produces magnetic effects; that is, a wire through which a current is passing will deflect a magnetic needle. It will also attract another wire parallel to it if a current be passing through that wire in the same direction, and will repel it if the current be passing in the opposite direction. This however is but a part of the story. What takes place when a current of electricity is passed through a wire may be thus stated:—

The instant the circuit is closed, a momentary current is induced in the wire in the opposite direction to that of the normal or primary current; this induced current disappears at once and the magnetic effect appears; when this is fully developed the wire becomes heated and the heating effect continues as long as the circuit remains closed, that is, as long as the current passes. When the circuit is opened the heating effect disappears, then the magnetic, and finally a momentary current of electricity is induced which has the same direction as the original current.

Thus momentary currents are induced in the wire on opening and closing circuit, while the magnetic force, when

it has attained a state of equilibrium, does not interfere with the heating effect.*

The strength of the induced currents is proportional to the strength of the primary current, the rapidity with which circuit is opened and closed and the length of the wire, and is much increased by arranging the wire so as to produce a strong magnetic effect. Thus if we compare the strength of induced currents in a given straight wire, then in the same wire coiled in a helix, and then in this helix after introducing into its centre a piece of soft iron, we shall find that the induced currents from the third arrangement will be stronger than those from the second, and those from the second than those from the first. The reason seems to be that in a helix each turn helps on induction in its neighbors, and the magnetised core reacts on the coil reproducing the force which made it a magnet.

A ready way of roughly estimating the strength of these currents is by their physiological effect and also by the brilliant spark produced on breaking connection.

As the current induced on closing circuit is in the opposite direction to the main current, it simply weakens this and is weakened by it; consequently its strength is small and must be measured by a galvanometer. The current induced on opening circuit is in the same direction as the original current so that the two currents strengthen one another, and this induced current shows bright sparks and gives strong shocks. This last induced current is called the direct extra current, and that on closing circuit the reverse extra current.

* A given current can do only a certain amount of work, whether that consist in pulling a magnet around, moving a wire, inducing a current, or heating the conducting wire. After the induced current on closing circuit has ceased, the magnetic effort absorbs probably all the energy of the current until equilibrium is established; for instance, till a magnetic needle has come to rest in a position due to the current, or the molecules of an iron core have assumed the magnetic state. When equilibrium is established, no further energy is employed in maintaining it, and the wire will be as much heated by the passage of the current as if no magnetic effect were maintained.

As the direct extra current is far stronger than the reverse extra current, it alone is considered in medical use, and the poles of medical instruments are marked with reference to it, the reverse current being neglected.

The electromotive force of the extra currents is much greater than that of the original current, though its strength is less; that is, less electricity passes. Apparatus for using the extra current is generally constructed so that the original current does not pass directly through the patient, or at least only a small part of it; a battery is connected with one or more coils wound around a soft iron core and an automatic break introduced in one of the connections close to the battery. One of the wires to the patient is connected with the automatic break next to the coil, and the other wire to the patient is connected with the battery. The automatic break is a contrivance by which closing the circuit, in magnetising a soft iron core, causes this to attract a small piece of iron attached to a spring. The spring is part of the circuit, and when no current is passing, touches a platinum point, also part of the circuit. When the current passes, the spring being pulled away from the point, the circuit is broken; the spring jumps back again, completing the circuit, the process is repeated, and so on.

With such an apparatus as has been described, the operation is as follows: On completing the connections a current flows through the break and coil, and back to the battery. A very small part of the current crosses over through the patient and back to the battery, but the resistance of the human body is so much larger than that of the coil that this current is very slight. When the circuit is opened at the break the battery is no longer in circuit, but the direct extra current passes through the coil, then through the patient and back to the coil. By this plan a single battery will give a smart shock, whereas if the patient were part of

the main circuit through battery and coil, his resistance would render several batteries necessary. In batteries arranged to pass the current directly through the patient, a separate battery is used to make and break connection; it is not in circuit with the main battery.

XII. Induced secondary currents. Suppose we have a wire connected with a battery, and call the whole the primary circuit; also a second wire parallel to the primary wire, which we call the secondary wire, the primary and secondary wires being nowhere connected; if we open the primary circuit a current is induced in the secondary wire in the same direction as the primary current; if we now close the primary circuit again, a current is induced in the secondary wire in the opposite direction to the primary current. These are the induced secondary currents, also called Faradic currents; they are momentary.

The strength of these currents is much increased by using coils of wire instead of straight wires, and by introducing a bundle of straight soft iron wires, called a core, into the primary coil. The secondary coil is wound around the primary. The object of using a secondary coil is to get high electromotive force from small battery power. The induced currents will be proportional to the strength of the magnetism in the primary core, and to the length of the secondary wire, also to the velocity with which the primary circuit is opened and closed; that is, not the number of makes and breaks in a second, but the quickness with which the breaking or making is completed; for a current occupies a sensible time in beginning and stopping.

This last point is of little consequence in medical coils, as little is required from them; but where a spark is wanted, it becomes of great importance.

For the proper construction of a medical induction coil then, we need a primary coil of thick wire with automatic

break, and around the primary coil about five or six hundred feet of very fine silk-covered wire.

In making the connections of an induction coil, whether it be a physician's instrument or one giving a long spark, the wires connecting the primary coil with the battery must be thick and as short as possible, for the circuit is one of low resistance, and a very slight additional resistance interposed in the circuit would materially weaken the current; but the connections from the secondary coil may be as long and thin as may be convenient, since the resistance of the secondary coil is so great that a few ohms more can make no difference. This is also true of the connections from the primary coil to the patient, if they are arranged as described above, because they do not form part of the main circuit at all.

While it is necessary that the primary and secondary coils should be carefully insulated from each other, it is no harm to connect one end of the primary coil with one end of the secondary, and this is actually done in one medical apparatus where four coils are so connected that the extra current from the primary coil or an induced secondary current can be obtained at pleasure.

These coils are also able to give induced currents of a higher order than the secondary. If a third coil be wound around a secondary, and the primary circuit be opened and closed, currents are induced in the third coil opposed to those in the second. With a fourth coil currents are also induced the reverse of those in the third. The electromotive force of these induced currents of the third and fourth order is quite large, but the quantity of electricity is very small, and becomes smaller with each remove. The instrument above mentioned is arranged to give these currents.

The strength of all induced currents in the primary or

other coils is much weakened by the presence of large pieces of metal around them; a tube of brass or copper placed so as to encase any of the coils or all of them brings the strength of the induced currents down to nearly nothing. In all medical instruments such a tube is provided and so arranged that it can be more or less drawn out so as to let its influence be reduced at will.

I have measured the resistance of some coils sold for medical purposes, as follows:—

| | | |
|---------------------|------------|------------|
| Small Pocket Coil. | Primary. | 1.15 ohms. |
| Dr. Kidder's. | First. | .13 " |
| " | Second. | .75 " |
| " | Third. | 163. " |
| " | Fourth. | 322. " |
| Galvano-Faradic Co. | Primary. | 1.27 " |
| " " | Secondary. | 398.73 " |

XIII.—In concluding this series I have thought it might be of advantage to enumerate some of the conditions to be observed in order to get the best results from electrical apparatus.

In any circuit the resistance of the batteries should be equal to that of the rest of the circuit to get the maximum magnetic effect of the batteries.

To get the maximum magnetic effect from a given electro-magnet the resistance of the wire coil should be equal to that of the battery used, and that of the connections should be as nearly nothing as possible.

These are the conditions to be observed when we can choose everything as we like it; for instance, in making a primary coil we can choose the wire and battery and connections.

If, however, a large resistance, such as the human body or even a small part of it be in circuit, the resistance of the batteries and connections is of little consequence.

If we wish to heat a wire by a battery we must use a battery whose resistance is equal to that of the wire at the

desired temperature. The resistance of a platinum wire at a white heat is about five times as great as at ordinary temperatures. The necessary electromotive force is to be determined by experiment.

To heat a long thin wire requires more electro-motive force, and allows more resistance in the battery,

To heat a short thick wire requires small resistance in the battery, but less electro-motive force is necessary.

The electro-motive force of any form of apparatus is independent of its resistance.

The electro-motive force of several batteries:—

| | | |
|------------|------|--------|
| Grove, | 1.80 | volts. |
| Bunsen, | 2, | " |
| Dipping, | 2, | " |
| Leclanché, | 1.50 | " |
| Gravity, | 1, | " |

I wish to correct the statement in § 2, first number, "A damp atmosphere is a conductor of electricity." In a damp atmosphere everything becomes covered with moisture and conducts, but the atmosphere does not.

THE MEDICATED SPRAY IN THE TREATMENT OF DISEASES OF THE CONJUNCTIVA.

By J. A. ANDREWS, M.D.

ASSISTANT SURGEON TO THE MANHATTAN EYE AND EAR HOSPITAL, N.Y.
PHYSICIAN TO THE NURSERY AND CHILD'S HOSPITAL, ETC.

THE use of the spray as a means of making applications of medicated fluids, enjoys the advantage that it spreads out in every direction, distributing itself equably to all parts of the diseased surface: not too much here, too little there, and none at all somewhere else; as must frequently be the case when medicaments are conveyed to the conjunctival surface in the usual manner, by means of a brush or a piece of cotton wound about the end of a match, or a dentist's cotton holder, or by being dropped into the eye. In the treatment of pharyngeal diseases, the spray is the choice method, and its advantage over other modes of making applications is generally conceded.

The advantage of this procedure is especially striking in the treatment of diseases of the mucous membrane of the eye lids. To these parts, the sulphate of copper is very frequently applied in crystal, or a solution of this and other medicaments is conveyed to the conjunctiva by the means above mentioned; and the eye being closed, it is left to the movements of the lids to bring the fluid thoroughly in contact with all parts of the conjunctival surface, the cornea, of course receiving in the majority of cases, an undesired share

of irritation. These manifest disadvantages are certainly avoided by the use of the atomizer.

This method is greatly appreciated by children, who shrink from the application of the "*blue stone*," etc. After having been once used, they will ask for the spray, and the cool stream of air which accompanies the spray, evidently gives great comfort. In other words, little patients do not fear the spray; and their lids, which, especially in acute inflammation of the conjunctiva, are kept spasmodically closed whenever the little ones are confronted with an application which gives them pain,—will be relaxed, and the somewhat rude manipulation often necessary in everting the lids, will be avoided when this procedure is resorted to.

I was first led to the use of the spray in the treatment of conjunctival diseases, during the spring of 1878, while treating a number of children with purulent conjunctivitis. Canthotomy was indicated and performed in all of the cases, and with marked relief; but there still remained great tenderness and considerable swelling of the lids, which bled quite unusually much, even on the gentlest handling; iced cloths were kept on the lids, a solution of borate of soda in camphor water, (B. P.) .30 gm. ad 30 gm. (gr. v— $\bar{5}$ i), was applied by means of the spray, to the closed lids, while they continued hot; these applications were made perhaps ten times in twenty-four hours in some of the cases, and there was no doubt about the comfort they afforded. The discharge from the lids was very profuse, and the eyes were frequently washed with a solution of sodium chloride in water, 4 gm. ad 32 gm., ($\bar{3}$ i— $\bar{5}$ i): a small bag syringe was used, the fine nozzle commonly attached being removed, so that the stream was quite a large one; but it has less force than when passed through the fine nozzle, which is an advantage, and the eye is certainly more easily cleansed.

After the subsidence of the more violent inflammatory

symptoms, a solution of alum or chlorate of potassa $\frac{2}{100}$, was applied to the conjunctiva with the atomizer.

Patients will, perhaps, not recover much sooner under this peculiar treatment, but they are certainly saved much unnecessary pain, especially when they are left to nurses or less experienced persons.

Davidson's Patent Atomizer is the one that I use, and it possesses the advantage that it can be worked with one hand, while the other remains free to manipulate the lids, etc.; this is, of course, not possible when the ordinary spray apparatus is used, and which requires the employment of two hands, the one to hold the bottle, the other to compress the bulb; the presence of an assistant, therefore, being necessary to maintain the everted lids in position.

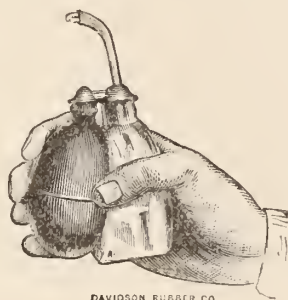
The instrument consists of a bottle, in the back of which is an excavation to receive the rubber bulb; the bottle must be held erect, or it will not work.

In the treatment of trachomatous conjunctivitis, with pannus, the spray, medicated with tannin, 1 gm. (gr. xv), glycerine, 8 gm. (3 ii), aqua, 30 gm. (3 i) may be directed directly upon the cornea, three times daily; or the sulphate of copper in $\frac{2}{100}$ solution may be used, but less frequently, once a day being sufficient, or chlorate of potassa, $\frac{2}{100}$ does good service. In such cases, the fluid should, I believe, be first warmed, as the cold spray might be followed by too much reaction. In winter, the bottle of atomizer should always be kept in warm water while in use.

Cantholysis will frequently be indicated in trachomatous conjunctivitis with pannus, and must, of course, not be neglected for the spray. In corneal inflammation, on the other hand, care must be taken to avoid spraying the cornea; this may be accomplished in the following manner:

First evert the upper lid and hold it so with the index

finger of the left hand, then pull down the lower lid with the thumb of the same hand; now direct the patient to close the eye; the two everted surfaces will thus be brought together, and the cornea completely protected; at the same time, a large extent of conjunctival surface will be exposed for the application of the spray. In order to effectually spray the superior and inferior palpebral folds, direct the patient, with the lids everted as above, to look alternately downward and upward; by this manœuver, these folds will be brought prominently into view.



EDITORIAL DEPARTMENT.

LUNACY REFORM.

II.

INSUFFICIENCY OF THE MEDICAL STAFF OF ASYLUMS.

The following paragraphs from the petition presented by citizens of the State of New York to their Legislature last winter, praying for a thorough investigation of asylums, may well serve as texts for our remarks :

“Superintendents of insane asylums are, nearly without exception, not chosen from among medical men who have pursued special studies in neurology at home and abroad, and who are well-trained physicians, but from among assistant physicians of asylums, who, after having been badly chosen (*vide infra*), have passed a number of years immured in an institution.

“Assistant physicians of asylums (future candidates for the position of superintendent) are nearly always men just issued from our too elementary medical schools ; men who have not served in civil hospitals (which can be entered only by severe competitive examination) ; their qualifications are not submitted to any test ; when in the institution they are not furnished with means of study (medical journals, books and instruments) ; and inevitably, as years go by, they forget what general medicine they knew on graduating. * * *

“Assistant physicians, moreover, are overworked and wretched-

ly paid. Their time is taken up by visiting too many patients, by writing interminable, useless histories of cases, and by various 'official' duties, such as talking by the hour with friends of patients, receiving visitors, etc."

A. Let us first consider the number of assistant physicians in the chief asylums of this State :

At the State Lunatic Asylum, Utica, there are four assistants to six hundred patients (1878), or 1 to 150.

At the Hudson River State Hospital, Poughkeepsie, there are two assistants to two hundred and thirty-two patients (1878), or 1 to 116.

At the Willard Asylum, Ovid, there are five assistants to thirteen hundred and forty patients (1878), or 1 to 268.

At the City Lunatic Asylum for females, Blackwell's Island, there are (1879), seven assistants to twelve hundred and sixty-seven patients or 1 to 180.

At the City Lunatic Asylum for males, on Ward's Island, there are (1879), five assistants to one thousand and eighty-four patients, or 1 to 217.

At the Kings County Lunatic Asylum, Flatbush, there are (1879), four assistants to seven hundred patients, or 1 to 175.

Physicians who have served in general hospitals as internes will at once appreciate the insufficiency of the above proportions.

In a general hospital, like Bellevue Hospital or the New York Hospital, there are several "divisions," each embracing one or more wards, and containing from fifty to eighty patients. A "service" or "division" is thought to be very heavy if there are one hundred patients in it. Now, each of these divisions is officered as follows : One visiting or attending physician or surgeon, who sees the patients once a day ; one house physician or surgeon and two assistants, a senior and a junior. These assistants are all graduates, and have been selected after a severe competitive examination. The house physician is in reality an assistant or pupil of the visiting physician, and so we obtain the proportion of 1 to 16, or 1 to 25, or 1 to 33, according to the size of the service. It may be replied that a general hospital service embraces many more acute

and serious cases than do the wards of a lunatic asylum. This is true, but the difference is not as great as might be supposed, because, first, there are always chronic or meaningless cases in a general hospital which require very little care ; second, the asylums which claim to be hospitals, and not simply homes, have many patients requiring personal attention ; and, third, there is something in the nature and management of insanity which demands unusual expenditure of time. Long conversations must be had with the patient and his friends in order to elicit a good history ; corporeal examinations are often made under difficult circumstances and must be repeated, etc. Granting that a general hospital service demands more active work than an asylum division, yet we believe that the proper examination and observation of patients in the asylum will consume as much if not more time. In any asylum which receives acute curable cases the present proportion of medical officers is, I believe, wholly inadequate.

B. How are assistant physicians selected and appointed ? Usually by recommendation to the superintendent without a public advertisement of the vacancy, and never with a thorough or competitive examination. In most asylums there is no pretense of an examination. It seems that some sort of examination is required of candidates for the position of assistant physician at the Ward's Island Lunatic Asylum. An inquiring applicant recently received the following letter of information :

DEAR DOCTOR.—Yours of —— inst. received ; in reply would say that the examinations are not competitive. Assistant physicians are appointed upon the recommendation of medical superintendent after having passed the Examining Board.

Yours respectfully,

A. E. MACDONALD,

Med. Supt.

This is not encouraging for those who hope for the appointment of better-qualified assistants. An "examination" which is not competitive and which does not of itself determine appointment is a farce.

It seems to me that there can be no real progress in this most important and fundamental matter until the mode of selecting internes for civil hospitals be adopted for asylums, with the necessary modifications in the range of questions. The Examining Board should be composed of neurologists and alienists, should be wholly independent of the superintendents, and the appointment should be given to the best man.

C. The education of the newly-appointed assistant physician, and the distribution of duties among assistant physicians, are matters of great importance. In the way of training let us see what is done for the junior assistant in a civil hospital. He is appointed, we must remember, after a victory in a close competitive examination; one which might well test the knowledge of his professor in the medical school. Flushed with this (real) triumph, he finds himself in the hospital a mere pupil; he is made to apply dry cups, give hypodermic injections, copy cases in large books, hold instruments or sponges at operations and clean them afterward. As senior assistant, after six or eight months of training, of teaching by his visiting physician, and senior, he enters upon somewhat enlarged duties, and even occasionally takes the place of the house physician and prescribes for the simple cases, or performs a minor operation. Even the house-physician or surgeon is, or should be, a pupil. He receives the diagnosis and general prescriptions from the visiting physician, and is responsible for their proper execution. He must esteem it a favor if he is allowed to take exclusive charge of a few cases. He learns how to do things.

The theory of the organization of the junior medical staff of a general hospital is based on the assumption that its members are pupils from first to last, and this is certainly the correct view. In practice of late years, I regret to be obliged to say, owing chiefly to the appointment of incompetent visiting physicians and surgeons through social or political influence, the old-fashioned relations of master and pupil which existed, and should always exist, between the visiting and the house physicians, have sometimes been annulled or even reversed.

If we now consider the assistants in asylums what do we learn? First, that although numerically subordinated, they all have equal medical functions, and each has charge (under the general supervision of the superintendent) of a large number of patients. They enter upon the performance of full duty and have the partial control of patients very soon after they enter the asylum, sometimes at once, and of course cannot bring to the task any enviable amount of training or of mental clearness. Besides, how can one man remember the essential points in the histories of one or two hundred patients?

It is susceptible of proof that these gentlemen obtain no training at all comparable to that which the junior and senior assistants in general hospitals have; they are not, and indeed cannot be, personally instructed in the method of examining patients, in physical diagnosis, in urinary analysis, in the use of the microscope, speculum, laryngoscope, ophthalmoscope, thermometer, electric batteries, etc. The older assistants are taken up with their respective duties, and the superintendent after his daily round is immersed in business and has no time for teaching. And with many superintendents, the question must be asked, are they competent to teach and train young medical men? Having usually been assistant themselves in former years, under the same lifeless system, they cannot be expected to possess the necessary requirements. This refers to general medical training, which the newly-appointed assistants greatly need, because they usually have not had the advantage of hospital residence after graduation; in the words of our petition, "they are nearly always men just issued from our too elementary medical schools."

But how is it with respect to teaching in psychiatry and cerebral anatomy, normal and pathological? Do superintendents lecture to their junior staff; do they provide them with monographs and new special works upon these subjects; do they spend hours with them in the wards teaching them how to observe the peculiarities of the insane, how to attempt a psychological analysis of delusions; or do they work with them in the pathological laboratory to enable them to understand a part of the path-

ology of insanity? Are these young medical men provided with the best medical journals which treat of insanity?

From conversations with a number of assistant physicians and from my personal knowledge of the working of asylums, I must say that no satisfactory answer can be had to these questions. It would appear that, apart from an occasional hint or remark by the superintendent, the assistant physicians are left to educate themselves, without example, without books and journals, without a knowledge of French and German, in many asylums without instruments. The assistant physicians who are the victims of this system, should certainly not be blamed, but the unscientific and non-medical organization which allows of such a state of affairs should be stigmatized and done away with. The insane have as much right as other hospital patients to the care of educated and competent medical men. The civilization of to-day will not, I hope, long tolerate the monstrous paradox that patients in general hospitals which are unsupported by the State or city, or which are maintained by a City on a starvation allowance, should have the attendance of the best medical talent, young and old, which can be found, while the maniacs, melancholics or general paretics in extravagant asylums erected by the State are under the care of inferior medical officers.

What remedy can be devised for this unfortunate condition of things, this qualitative insufficiency in the medical staffs of asylums? It seems more than doubtful to me if any radical measures, any legislative enactments would do good. It would manifestly be unjust to remove the all assistant physicians now in place; and it must be borne in mind that many of them are anxious to be taught and to learn. Are they to blame if there are no master-minds to guide them? It seems to me that the best measures for raising the standard of qualifications among assistant physicians would be:

a. The appointment of one independent Examining Board for all asylums. Such a board could be easily made up of members of consulting medical boards of asylums, of physicians especially interested in neurology and psychology, and should sit in New

York. The occurrence of a vacancy should be widely advertised in medical journals, in medical schools and in general hospitals. There is so much that is desirable or should be, in the position of assistant physician on a greatly raised standard, that I have little doubt but that a very good class of applicants might be obtained for a fair competitive examination. I might also throw out the suggestions that such a board ought to be small, composed of not more than five members, that they should receive an honorarium for each examination, that the questions should be of such a nature as to show the capacity and tendencies of the applicants, and not their mere automatic (and temporary) remembrance of minutiae which may have been gummed to their brains by that demoralizing machine known as the "cram-quizz"; the future assistant physician should know German or French or both these languages well enough to read a page of a medical book or journal easily, he should understand the ordinary manipulation of the various instruments employed in scientific diagnosis, he should know how to take a systematic history of a case and how to reach a diagnosis by the symptoms present or by exclusion, he should (shall I add it?) write a fairly pure and correct English style, unless he be a foreigner. That the examination should be minute upon psychiatry seems to me undesirable; a fair reading knowledge of psychology and insanity from one or two recognized textbooks ought to suffice, as the real study of this subject is to be made in the institution and is to constitute the focus of the assistant's intellectual work.

b. By the appointment of superintendents who will be able to teach their assistants, instruct them in cerebral anatomy, in special microscopic *technique* and histology, in the finer points of diagnosis and prognosis, in the higher art of moral management of the insane, etc. The manner of securing the services of men truly fitted for the important position of medical superintendent of a *hospital* for the insane will be considered in a succeeding number of the ARCHIVES. Suffice it to say that in this case also we are opposed to summary measures except in a few instances, and would prefer to see the result obtained by a more natural method.

Let us sum up the conclusions of this criticism :

1. The number of assistant physicians is too small in all our asylums. The number should be increased until the proportion of physicians to patients rises to 1 to 50 at the least. This is on the supposition that the present common housing of incurable cases and of acute, often curable cases continue. In the true hospital of the future, reserved for acute cases, the proportion should be, in our opinion, as high as 1 to 20. In asylums or homes for the incurable chronic insane, as the Willard Asylum, a proportion of 1 to 100 might be allowed.

Besides, it would be beneficial to the institution and to the public outside to have a corps of temporary assistants or *internes* attached to every asylum. It would not be difficult, I believe, to induce excellent men just finishing their general hospital course to come to our asylums for six months' study and work. They should receive no salary, but ought to be comfortably lodged and have a good table. By their help much systematic work of observation and treatment might be done even in the "palace asylums;" and probably among these physicians a few would conceive a liking for the specialty and present themselves for examination for the position of assistant physician. Those who served only their six months would go out to private practice with a real knowledge of insanity, and would prove extremely useful in their respective communities.

2. In the future, better qualified assistant physicians should be secured by a competitive examination before an impartial board.

3. Adequate means should be provided in the asylums in the way of personal teaching, a good library, ample supply of medical journals, instruments, etc., for the continued education and self-development of assistants. These gentlemen should be allowed the privilege of an occasional special course of instruction in a large city, and should be encouraged to produce original work of any kind in connection with the specialty. The public should know by this time, after so many years of ill-directed extravagance, that a moderate expenditure for the purpose

of "finishing and furnishing" the brains of the physicians of asylums is of more utility to the patients, and indirectly to every family in the State, than the same sum spent in fancy architecture inside or outside.

E. C. SEGUIN, M.D.

NEW BOOKS AND INSTRUMENTS.

Clinical Medicine.—A Systematic Treatise on the Diagnosis and Treatment of Diseases, designed for the use of Students and Practitioners of Medicine. By AUSTIN FLINT, M.D., Professor of the Principles and Practices of Medicine, and of Clinical Medicine in the Bellevue Hospital Medical College, etc., etc. 8vo. pp. 795. Henry C. Lea, Philadelphia, 1879.

This volume differs greatly in plan from most treatises upon clinical medicine. Works of this class, as a type of which Trousseau's Clinical Medicine may be instanced, are as a rule, arranged without strict reference to the conventional ground-plan of the topics which determines the form of systematic treatises on the practice of medicine. They treat not so much of the special diseases as of particular cases—the men and women ill of the diseases. Therefore cases form the convenient texts of the discourses, and such facts as the natural history of the patients' malady presents, and such further information as the knowledge and experience of the teacher may bring to the illustration of the matter, form the body of the discourse. The personality of the writer and that of his patients are brought strongly to our attention. His style, uncramped by formal sub-divisions of the subject, flows on with an ease, which has, if it have no greater charm, the charm of naturalness. If he be not exhaustive as regards the subject on the one hand, on the other he is not tiresome as regards the reader. A volume on clinical medicine should be to the treatise on practice, what the clinic is to the didactic lecture. What it falls short of in comprehensiveness, it makes up in the vividness of the presentation ; so that the two are complementary.

It is in accordance with this view that the author states in his

preface, that the work is intended to accompany, and not, in any manner, to supersede, more comprehensive treatises embracing the morbid anatomy, the causation and the pathology of diseases.

Its preparation is due to the belief that a work devoted to the diagnosis and treatment of diseases would be of aid to the medical student in his clinical studies, and useful as a book of reference to the practitioner.

The result of the undertaking justifies this belief. I know of no single work in general medicine which, within so small a compass, so fully meets at the same time, the every-day wants of the student and of the practitioner. The subject matter is comprised in an Introduction and six Sections.

The Introduction covers sixty pages. It is devoted to the consideration of topics of importance bearing on the study and practice of medicine ; such as the examination of patients, case-taking and reports, and general symptomatology.

Diseases are divided into two groups, General and Local, and the latter are distributed into classes corresponding with the different physiological systems. Each of the sections is prefaced by observations upon the symptomatology of the diseases to which it is devoted.

Section First comprises diseases of the respiratory system. The preliminary observations have reference to the symptoms and physical signs. The remainder of the section is devoted to the diagnosis and treatment of diseases of the organs of respiration, including the larynx.

The author classes acute pneumonia among the local diseases out of deference to custom ; but he regards it as essentially a fever, of which the lung process is the anatomical characteristic—a doctrine which appears to be gaining ground both in England and America.

He also teaches the doctrine of a primary pseudo-membranous laryngitis, (croup), a local affection occurring independently of diphtheria, of which it is, however, a complication in a certain proportion of cases. He thinks that it has the same pathological relation to simple laryngitis that the so-called plastic variety of bronchitis has to simple bronchial inflammation.

Section Second treats of the diseases of the circulatory system. Remarks upon the symptoms and physical signs, first, of diseases of the heart, then of diseases of the vessels, constitute the prefatory portion of this section. Then follow diseases of the blood, inflammatory and non-inflammatory diseases of the heart, its func-

tional disorders, and diseases of the vessels, namely aortitis (atheroma), aneurism, thrombosis and embolism.

Writing of the treatment of pericardial effusion, Professor Flint predicts that, within another quarter of a century the operation of puncturing the pericardium for the withdrawal of serum or pus will be regarded measurably as we now regard *paracentesis thoracis*—as a “trivial operation.”

In view of the occasional serious results that follow the latter operation, the adjective “trivial” seems too mild.

The experience of the author is in accord with that of the writer of this notice in regard to the difficulty of inducing patients to submit to the “absolute rest cure” of internal aneurism, a difficulty which has amounted to practical impossibility. Iodide of potassium is mentioned as the one drug that contributes to the object of treatment. Two very interesting cases are given as examples of notable progress in the direction of spontaneous cure of aneurism of the thoracic aorta.

Section Third has to do with diseases of the Digestive System. It begins with remarks upon vomiting and the matters vomited, the dejections, abdominal pain, the methods of examination, abdominal tumors and rectal alimentation. Diseases of the glands of the neck, namely parotiditis, goitre and scrofulous enlargement of the cervical glands are included in this section.

The importance of the subject of functional disorders of the liver demands, in my opinion, more than the brief consideration it receives upon two pages of a treatise of this kind.

The section is concluded with brief mention of the diseases of the spleen and pancreas.

Section Fourth treats of diseases of the Urinary System. It begins with the examination of the urine and a discussion of uræmia and its management.

Section Fifth occupies much more space than any of the others. It embraces diseases of the Nervous System. The preliminary remarks relate to symptoms connected with general sensibility, the special senses, the mental faculties and muscular movements. Myalgia is included among the neuralgic affections. Mental diseases are briefly considered in a special sub-division at the end of this section.

Finally, the Sixth Section is devoted to fevers and other general diseases, including rheumatism and gout, and epidemic cholera.

It is to be regretted that the separate consideration of the diagnosis and treatment of syphilitic affections has been omitted. In the present state of our knowledge, syphilis finds a large place in

medicine, and the importance of the subject claims the fullest consideration in every systematic treatise. Some of the accidents of syphilis belong to surgery, but the natural history of the disease, as it comes to be more and more known, places it within the boundaries of clinical medicine.

Professor Flint has overcome the difficulties which beset the discussion of the diagnosis and treatment of diseases apart from their causation, morbid anatomy and pathological processes, in a masterly manner. And these difficulties are by no means slight. Indeed, in theory they are insurmountable. The whole of the diagnosis of a disease lies often in the detection of the cause; the whole of treatment in the removal of that cause. *Causa sublata, tollitur effectus* is an adage nowhere more true than in medicine. The association of morbid anatomy and pathology with diagnosis and treatment is no less close. Latham has said that the treatment of diseases, rightly considered is, in fact, a part of their pathology.

But for the use of practice, artificial divisions of subjects not in themselves separable must be made. And it is here that the skill and learning of the great clinician are displayed. He has given us a store-house of medical knowledge, excellent for the student, convenient for the practitioner, the result of a long life of the most faithful clinical work, collected by an energy as vigilant and systematic as untiring, and weighed by a judgment no less clear than his observation is close. But the student must have been diligent in the other branches of medical study, or the ready information at his hand will betray him into the errors of false confidence; and the practitioner who seeks for aid in diagnosis, where morbid anatomy is not, or for therapeutic suggestions that do not spring from direct pathological considerations, will too often search in vain. But in truth there is much more of pathology in this book than the title or the preface would lead one to suppose.

It is a practical work-day book of reference to stand side by side upon the shelves with Flint's Practice. And its formal arrangement makes it the more useful as a book of reference. But I confess to a feeling of disappointment in finding in it so little that could not readily have found place in the Practice, of which it is, in great part, a well-executed *replica*. In appearance this volume corresponds with the author's previous publications, which are familiar to all American students of medicine.

The index is incomplete and disappointing, and a list of *errata* indicates oversight in the reading of the proof in no fewer than eighteen pages.

[J. C. W.]

Treatise on Hygiene and Public Health. Edited by ALBERT H. BUCK, M.D. In two volumes. New York. William Wood & Co., 1879, pp. 657 and pp. 792.

These two handsome volumes from the pens of twenty-two contributors, offer a very satisfactory compensation for the single volume on public hygiene, omitted from the translations of *Ziems-sen's Cyclopædia*. They cover much more ground than the German treatise they replace, for they include topics of individual hygiene which are there left untouched; and yet discuss public hygiene with at least as much fullness of detail and precision of *technique* as characterize the volume of the cyclopædia. The general plan of the work contemplates a range of inquiry which is expressly repudiated by the authors of the *Handbuch*. They propose to investigate only those conditions which are known to produce some *disturbance* of the (public) health; but the American treatise seems designed to analyze the conditions of healthy life, and to refer by implication to the disturbance. This latter plan is that adopted in the classical treatise of Michel Levy, from which however, Dr. Buck's differs in many respects. It is worth while to contrast the summary of the arrangement in the two.

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| | BUCK. VOL. I. |
| | PART I.—INDIVIDUAL HYGIENE. |
| | Infant Hygiene. |
| | Food and Drink. |
| | Drinking Water. |
| | Physical Exercise. |
| | Care of Person. |
| | PART II.—HABITATIONS. |
| | Soil and Water. |
| | Atmosphere. |
| | Hospitals. |
| VOL. II. | PART I.—OCCUPATIONS. |
| | Professions. |
| | Camps, Navy. |
| | Coal Mines, Metal Mines. |
| | PART II.—PUBLIC HEALTH. |
| | Infant Mortality. |
| | Vital Statistics. |
| | Adulteration of Food. |
| | Public Nuisances. |
| | Quarantine. |
| | Inland Quarantine. |
| | Small-pox and other con- tagious diseases. |
| | Syphilis. |
| | Disinfectants. |
| | Village Sanitary Assoc'n. |
| | School Hygiene. |

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| | LEVY. PRIVATE HYGIENE. |
| | SECT. I.—INDIVIDUAL DIFFERENCES. |
| | Temperaments, Hereditary influences, |
| | Idiosyncrasies, Habit. |
| | Age. Constitution. Con- valescence. |
| | Sex. Morbid imminence. |
| | SECT. II.—MODIFICATIONS. |
| | Circumfusa. |
| | Ingesta. |
| | Excreta. |
| | Applicata. |
| | Percepta. |
| | Exesta. |
| | PUBLIC HYGIENE. |
| | SECT. I.—COLLECTIVE DIFFERENCES. |
| | Race. Age. |
| | Sex. Population. |
| | SECT. II.—MODIFICATIONS. |
| | Circumfusa. |
| | Ingesta. |
| | Excreta. |
| | Applicata. |
| | Percepta. |
| | Exesta. |

It is at once apparent that the classification and distribution of subjects in the American treatise is extremely unsystematic, and guided by no general principle. The division of parts seems to be entirely according to volumes, and not according to the natural divisions of private and public hygiene ; for the chapter on occupation is made to belong to Part I of the second volume, although Part II of individual hygiene had already been given in the first, and devoted to *Habitations*, equivalent to the *circumfusa* of *Levy*, or to the *airs, soils, and waters* of *Hippocrates*. A section on hospitals is included in this chapter on *Habitations* for well people,—a place where, according to well-established precedent, such a section would scarcely seem to belong.

The irregular classification leads to some repetitions, and also to unnecessary subdivisions. Thus the hygiene of infancy and childhood is discussed in the first chapter by *Dr. Jacobi*, principally in relation to food ; in a chapter by *Dr. Curtis* on infant mortality, and in the concluding chapter of the book by *Dr. Lincoln*, devoted to school hygiene. This subject had already been dwelt upon at some length by *Dr. Jacobi*. The question of quarantine is split in two ; pyretic contagious diseases are separated from syphilis, while a separate chapter is devoted to disinfectants. Neither this chapter, nor that which follows it on village sanitary associations could find any logical place in a systematic analysis either of the conditions of health, or of the causes of disease.

This curious irregularity is probably due to the multiple authorship of the treatise. And having noticed it, we hasten to say that it really detracts little or nothing from the intrinsic value of the book, which is, in compensation, free from the endless verbiage which makes *Levy's* standard treatise tiresome in spite of its elegance and its erudition. The degree of erudition in the volumes before us varies very much in the different chapters ; but the general tone is that of writers practically acquainted with the matter in hand, and anxious to establish practical rules in regard to it, rather than that of scholars aiming merely to present the literature of the subject, without anticipating that any one's actions will be affected by such presentation.

Were we to express personal preference, we should select the introduction, by *Dr. Billings*, and the paper on physical exercise, by *Dr. Ball*, as the most attractive parts of the book. *Dr. Billings* at once places the subject of hygiene in a noble light when he declares that, "in its broader sense, the study of hygiene includes the examination of the conditions which effect the genera-

tion, development, growth and decay of individuals, of nations and of races, being on its scientific side coextensive with biology in its broadest sense, including sociology, rather than with physiology merely, as some writers state." Dr. Billings suggests the introduction of a new profession—that of sanitarian—training for which should include studies in medicine, engineering, and law, so that the expert might assume in his own person the qualifications now distributed throughout a board of health ; a very suggestive suggestion.

The bulk of the introductory chapter is occupied by one section on the causes of disease, and by another on the jurisprudence of hygiene. In the first, the causes of disease are classified as hereditary, physical and chemical, organized or vital, mental or emotional. The third class embraces epidemic, infectious or zymotic diseases ; and in touching upon them, the writer discusses briefly, but with great clearness, the modern theories of the living organisms to which these diseases are attributed.

Under the jurisprudence of hygiene, Dr. Billings discusses the delicate question of the right of the State to interfere with individuals for sanitary purposes. This discussion is particularly interesting in connection with an attempt recently made by so influential a person as Herbert Spencer, to discountenance all sanitary administrations whatever.* In some details, the right is undisputed, as in regard to nuisances, defined as such at common law, and whose abatement is entrusted to the police. In others, the claim for State interference is, so far, purely theoretical,—as for the prevention of hereditary disease by rendering illegal marriages between persons tainted with insanity, syphilis, or drunkenness. The discussion of this question is justly waived, as having at present little practical interest, but the writer makes in connection with it one rather singular remark : "The prevention of propagation of hereditary disease, means also the prevention of life, and between this, the prevention of conception at the will of the parents, and induced abortion—there can be no sharp dividing lines."

The organization and powers of Health Boards are very carefully and fully considered, and valuable practical suggestions made in regard to them. "The State Board of Health should be a central supervising authority, whose functions are : to promote the organization of local and municipal boards ; to obtain medical

* Incidentally, in the volume on Sociology published in the *International Scientific Series*.

and vital statistics ; to investigate causes of undue sickness and mortality ; to act for the removal of these causes, as far as possible, by local sanitary authorities." Finally, to this Board should be entrusted the "supervision of hygiene in State institutions, and also of quarantine."

Dr. Ball's paper on physical exercise is particularly striking, because of an extension given to the physiological aspect of the subject, unusual in a treatise on hygiene. An extremely interesting summary is given of the most recent physiological researches on the local phenomena of muscular action ; on the general effects of exercise on the respiration, circulation, cutaneous secretion, digestive and nervous systems, and on the urine, the latter including the famous but somewhat conflicting experiments of Fick and Wislicenus, Parkes, and Flint. The source of muscular power is discussed, the mechanism of the growth of muscle and the pathology of over-exertion. Nobody familiar with the rare dominance in modern physiology of the problems relating to the physiology of muscular action can fail to be charmed with this summary, at once elegant, comprehensive and concise, and most suggestive for the philosophical understanding of the hygiene of exercise. Properly speaking, however, the hygiene of exercise is *not* discussed ; for the second half of the chapter contains, instead of such discussion a description and analysis of gymnastic and athletic exercises. It is prefaced by an interesting historical sketch, of the development of habits of educational exercise, from the laws of the Spartans to the Turnvereine of the Germans. The chapter, therefore, contains all the necessary data upon which any one wishing to exercise as a means of preserving health may shape out a course for himself ; but such a course is not shaped or even suggested by the writer ; nor are the relations of exercise to the cure or even the prevention of disease dwelt upon. The second half of the chapter, like the first, remains within the limits of the theory of exercise, making less attempt at practical rules than any other chapter in the treatise. We notice however with pleasure the criticism on Ling's system of calisthenics, now so much in vogue in schools as a substitute for exercise, which should really be "sufficiently energetic to produce a decided impression on the vascular and respiratory systems."

The article on the care of the person, by Dr. Van Harlingen, contrasts with the foregoing, in consisting almost exclusively of practical rules, and is therefore much less interesting to read. A

reserve, perhaps natural to a dermatologist, is maintained, in regard to the remedies alluded to for baldness or for epilation, which can only be obtained by recourse to the "best medical advice."

"Soils, airs and waters" are discussed with a fullness of *technique* which exhibit the most modern expansion of the original Hippocratic meditation on the subject—a subject to which the researches of Bowditch on the telluric origin of phthisis, and those of Pettenkoffer on the telluric influences regulating the intensity of cholera epidemics, have so recently added a new and vivid interest.

We cannot attempt to analyse either these chapters, or those, equally elaborate and painstaking, which refer to the hygiene of occupation, of camps, of the marine, of mines.

The chapters on quarantine are of importance in view of the recent terrible experience with yellow fever, and of the anticipated invasion of even Northern States by cholera. The chapter on inland quarantine is contributed by Dr. Herrick, secretary of the Louisiana State Board of Health. He affirms that "the lessons of the recent epidemic must bring the unprejudiced mind to the belief that there was a clear relation between enforcement of quarantine regulations, and prevalence of yellow fever in all threatened communities—that is to say, that there was no security in a loose system, and complete safety in absolute non-intercourse."

The impartial testimony of the Louisiana secretary is that "the recent adjournment of the Legislature without accomplishing a single measure of sanitary legislation, though no less than five bills of this nature were brought before its notice and favorably reported on by the appropriate committees, speaks very discouragingly for the suppression of yellow fever through State action." Dr. Herrick finds more promise from the action of the national Congress. He draws up a detailed, and, as it seems to us, thoroughly practical set of rules for quarantine, in regard both to cholera and to yellow fever, and is sanguine enough to believe that the former disease, not being transmissible by baggage, "ought to be effectually stamped out of a town, which has a well-organized board of health, within a few weeks."

This reflection, if sustained by experience, could hardly fail to constitute the most favorable demonstration to the public mind of the value of organized hygiene as a measure of public safety—in relation, at least, to those horrible epidemic dangers in whose presence organized social action has always been recognized as necessary.

[M. P. J.]

The Treatment of Diseases by the Hypodermic Method; a Manual of Hypodermic Medication. By ROBERTS BARTHOLOW, M. D., etc. Third edition, enlarged. Phila., J. B. Lippincott & Co., 1879, pp. 249.

This little book must prove a very useful manual for students, but we cannot help hoping that it will soon be thoroughly revised. Several chapters contain uncorrected statements which would lead the reader into doubting Dr. Bartholow's familiarity with pathology. A first part of the work treats of the history of the subject and of technology. Under this latter heading various hypodermic syringes are described, and the proper care of them insisted on. We cannot agree with the author in his recommendation of the solid silver syringe, for we believe that it is of the utmost importance to be able to judge of the clearness and purity of the solution as it stands in the syringe. Besides, we have never had personal experience of the fragility of glass tube syringes, which we unhesitatingly recommend. The real or imitation Charrière seems to us the ideal syringe. The care of the syringe is well stated, and to it we would add the use of oil or vaseline on the wire which is placed in the needles.

Part second treats of special therapeutics, and it is here particularly that we meet with old references and some quite antiquated statements. The chapter on strychnia perhaps best illustrates these points. In it we are told, on two pages, that "it (strychnia) is not proper in acute cases involving structural alterations of the spinal cord." Yet Dr. Bartholow recommends it in infantile paralysis, a disease which we now (since 1870) know to be structural and organic. Again (p. 150) it is stated that the contraction of palsied limbs in hemiplegia is due to an "irritative action about the site of the extravasation," yet the author undoubtedly knows that it is due to the secondary degeneration in the spinal cord. Again it is said (p. 152) that strychnia has been used with great advantage in cases of "progressive muscular atrophy"—in our opinion a deluding statement. The text further implies that Dr. B. endorses Barwell's view that strychnia has a direct influence on paralyzed muscles when injected in them—a most unphysiological and unfounded statement. On page 151, it is advised to give ̄i doses of bromide of potassium as an antidote to strychnia poisoning. We would advise the reader not to attempt this for the simple reason that strychnia acts in a few minutes, and bromide of potassium only after many hours. In the chapter on mercury there is no reference later than 1872, and albuminous solutions of this drug are not sufficiently described or recommended.

On page 234, the use of injections of water for the relief of pain is ridiculed. This, we assure the author, is unnecessary, because these injections *do* relieve pain sometimes, as we and many others can testify. Lastly, we would remark that nothing is said of the hypodermic injection of brandy and whiskey, of iron, of camphor (for insomnia). We must repeat that while the book must prove useful in its present shape, it justly needs a thorough revising and enlarging. [R. W. A.]

The Medical and Surgical History of the War of the Rebellion, Part II, volume I, Medical History, being the second medical volume prepared under the direction of Joseph K. Barnes; Surgeon-General United States Army. By JOSEPH JANVIER WOODWARD, Surgeon United States Army. First issue. Washington, Government Printing Office, 1879, pp. 869.

This volume is exclusively devoted to medical subjects, and in it the profession will find much valuable information, obtained by a careful study of the statistics and materials furnished by the war of the rebellion. It is the most ambitious work of the kind which has yet appeared, and moreover one will be the more disposed to bestow a greater appreciation upon the work when he learns that it was as late as the second year of the war that a medical and surgical history was conceived and entered upon, and that the whole machinery for the collection of statistics, the preservation of pathological material, and the recording and arrangement of the case-histories, had then to be instituted for the first time. In this volume are some of the results which have been obtained by a careful sifting of the immense amount of statistics and materials accumulated, and the conclusions derived have been elaborated up to the extent of the latest contributions of pathological and therapeutical science. This volume treats of the alvine fluxes, and this subject has been selected by reason of the greater amount of sickness and mortality induced by this group of diseases. The first part of the work is made up of statistical remarks and extracts from surgeons' reports. The statistics are derived from 1,735,139 cases. The remainder of the volume is occupied by remarks on the pathology and treatment of diarrhœa and dysentery.

The following classification is the one adopted :

1. Acute diarrhœa.
2. Acute dysentery.

3. Chronic dysentery.
4. Diarrhœa connected with tubercular ulceration of the intestines.

The lesions in acute diarrhœa are generally seated in the colon and cœcum, but more or less extensive tracts of the small intestine, especially of the ileum, are often involved also. Dr. Woodward here very well calls attention to the erroneous opinion even now held by many physicians. "According to this opinion, the small intestine is the part of the alimentary canal particularly concerned in diarrhœa, the large intestine in dysentery; and while diarrhœa is rather to be looked upon as a symptom of several morbid conditions than as a distinct disease, yet so far as it depends upon irritation or inflammation of the intestinal canal, it is to be referred to the small intestine."

Considerable space is devoted to the results of microscopical examination of the stools in the different fluxes, but no new light is shed upon the subject except that Dr. Woodward states that he has discovered that all of the low vegetable forms which are present in the stools of the several fluxes, are also present in normal fœces freshly voided.

The gross post mortem appearances, as well as the histology of the inflamed tissues, are illustrated profusely, not only in acute diarrhœa but in the other fluxes, by chromo-lithographs, steel plates, wood cuts, photographs, micro-photographs and heliotypes. In connection with the sequelæ of dysentery, Dr. Woodward remarks that intestinal stenosis, the result of dysenteric ulceration, seems to have been much rarer than might have been supposed. "No case has been reported to the Surgeon-General's office either during the war or since; the Army Medical Museum does not possess a single specimen, nor have I found in the American medical journals any case substantiated by post mortem examination in which this condition is reported to have followed a flux contracted during the civil war." Dr. Woodward can find but one American specimen of stricture following dysentery, and that is to be found in the museum of the New York Hospital. In this specimen the stricture is located in the rectum, and is reported as resulting from tropical dysentery.

The account of tubercular ulceration of the intestines, with some excellent illustrations, is well presented.

As regards the etiology of diarrhœa and dysentery he concludes that a scorbutic taint and malarial infection are the most common predisposing causes, and that insufficient and improper food is the

most common exciting cause, and indeed often the sole cause. In regard to the contagiousness of dysentery Dr. Woodward believes that the weight of evidence is against it.

The treatment of diarrhœa and dysentery is very fully considered, and this, we believe, will be the most interesting, instructive and suggestive part of the volume to the civil practitioner. Prophylaxis, general management and diet are considered at length. In regard to the beef tea and extract of beef it is said: "Chemical analysis, physiological experiment and clinical experience combine to show that neither beef tea nor meat extract is the nutritive equivalent of the amount of meat from which it is made. It may be conceded that both exert a feeble stimulating action, that they favor to some degree the digestive functions and that they possess slight nutritive properties; but as yet the more thoroughly each of these effects have been investigated the more trifling it appears to be."

In medication by the mouth, the ipecacuanha treatment was used by very few, and the results were uncertain. In treatment by purgatives he concludes that in the beginning of the fluxes and occasionally during the course of the disease the administration of sulphates of soda and magnesia, rochelle salts, and rhubarb, is often attended with benefit, but he is inclined to condemn the use of calomel, castor oil, and cream of tartar.

No positive or favorable results have attended the use of diaphoretics or diuretics. Dr. Woodward presents very decided objections to the use of opium in the treatment of the above fluxes, and especially in dysentery. Not only does it produce anorexia but it arrests the peristaltic action of the intestines and the fermenting or putrefying matters composing the stools are retained in contact with the mucous membrane intensifying the inflammatory action. Moreover the tormina and tenesmus are almost always easily relieved by the proper use of evacuants and other measures. In some special cases the use of opium may be justifiable and in most of such cases the hypodermic method of administration is to be preferred if possible. He also reports favorably when opium must be used on its combination with hyoscyamus, or with belladonna or atropia.

With reference to astringents, tannic acid is regarded as of no value, and gallic acid only in cures of hæmorrhages from the bowel, or in very mild fluxes. Alum is unfavorably regarded, likewise the astringent preparations of iron. Sulphates of zinc and copper, oxide of zinc, nitrate of silver, and acetate of lead, are noticed unfavorably.

Subnitrate of bismuth is highly commended in painless diarrhœas after the use of evacuants and in chronic fluxes, and he believes that in the latter cases the cicatrization of the intestinal ulcers is favored by its use provided that it be given in sufficiently large doses. Pure preparations must of course be bought, and the chemical analyses of the samples offered for sale to the Medical Department in the last few years show that a trace of arsenic is exceedingly common, and that sometimes considerable quantities are present. A review of the many tonics used, of the mineral acids, of aromatics, resins, balsams, oil of turpentine, camphor, antiseptic remedies, of arnica, ergot, arsenic, bromine and iodine and chlorate of potassa are given, but no results of value are given from their use.

The treatment by enemata of hot and cold water, and other methods of local treatment are considered at length, but none of them especially endorsed.

Throughout the entire volume great care has been taken to submit references in foot-notes and the name of the author, the edition and page are as a rule given. Very few typographical errors have been observed.

[McB.]

ABSTRACTS AND SUMMARIES.

Cerebral Temperatures. Drs. MARAGLIANO and SEPPILI, of Reggio-Emilia, Italy, have undertaken some interesting investigations into the cerebral temperature of the insane and the sane ; in the latter confirming the observations of M. Paul Broca, of Paris, and Dr. L. C. Gray, of Brooklyn. Their essay was read before the Medical Congress at Pisa, September 28, 1878. Their conclusions in regard to the insane are that : 1. It is exceptional to find the average temperature of the head higher than normal in simple lypemania and dementia. 2. The highest temperature is found in furious mania, 36.9° , then in decreasing ratio, in lypemania agitata, 36.8° ; in progressive paralysis, 36.6° ; dementia agitata, 36.5° ; imbecility and idiocy, 36.3° ; simple mania, 36.3° ; simple lypemania, 36.2° ; simple dementia, 36.0° . 3. In all mental disease, the occipital lobes are of lower temperature than the others ; the temperature of the frontal lobes, which equals that of the parietal in dementia agitata, in idiocy and imbecility, is higher in mania, in simple lypemania and simple dementia ; whereas in progressive paralysis and lypemania agitata the temperature of the parietal lobes is higher than that of the frontal. 4. In all the principal groups of mental disease, the averages of the two sides of the head are almost equal, with the exception of congenital forms, in which the various regions of the right side show a higher figure than the left. 5. The results of cerebral thermometry, compared with what we know of the pathological anatomy of the diseases under consideration, tend to show that in progressive paralysis, mania and the different periods of exacerbation which often manifest themselves in forms of mental depression

and debility, there exists a hyperæmic condition of the brain. 6. The general temperature of the body of the insane, taken in the axilla and rectum, is higher in lypemania agitata and mania furiosa, and generally goes on decreasing in regular order in progressive paralysis, dementia agitata, simple mania, imbecility and idiocy, dementia tranquilla and simple lypemania.

These authors found the cerebral temperature of the sane to be higher than did Broca and Gray, their figures for the individual lobes being on the average 1.96° greater, whilst they found the whole head 1.92° warmer. They explain this disparity by the fact that they did their work in June, July and August, whilst Broca and Gray performed theirs in the winter and early spring. In fact, the Italian investigators made some observations in December, and found the figures very nearly those of Broca and Gray. Thus they conclude that the disparity is explained by the difference of the temperature in the surrounding atmosphere. Prof. Maragliano ascertained that thermometers placed on the skull were accurate indices of the temperature of the contents of the skull. He filled a skull with water at different temperatures, leaving the integument and hair in place, and he ascertained that the thermometers placed externally followed faithfully the oscillations of temperature of the water within as denoted by thermometers placed therein. He also found that during sleep induced by chloral, there is a constant decrease of temperature. In three cases of embolism of the brain, too, he found the temperature decreased.

Subjoined are the tables given by Maragliano and Seppili in the different forms of mental disease, in the centigrade scale.

LIST A.—AVERAGES IN MEN.

| No. of Pat's. | Form of Disease. | Frontal Region. | | Parietal Region. | | Occipital Region. | | Half the Head. | | Average Entire Hd | Axilla. | Rectum. |
|---------------|---------------------------|-----------------|-------|------------------|-------|-------------------|-------|----------------|-------|-------------------|---------|---------|
| | | LT. | RT. | LT. | RT. | LT. | RT. | LT. | RT. | | | |
| 6 | Furious Mania | 37.13 | 37.06 | 36.98 | 36.91 | 36.81 | 36.78 | 36.97 | 36.91 | 36.94 | 36.90 | 37.61 |
| 6 | Simple Mania | 36.50 | 36.58 | 36.43 | 36.38 | 36.08 | 36.06 | 36.33 | 36.54 | 36.33 | 36.48 | 36.98 |
| 16 | Simple Lypemania | 36.33 | 36.30 | 36.23 | 36.25 | 35.91 | 36.00 | 36.15 | 36.18 | 36.16 | 36.43 | 36.83 |
| 5 | Dementia Agitata | 36.42 | 36.42 | 36.52 | 36.46 | 36.26 | 36.32 | 36.40 | 36.40 | 36.40 | 36.88 | 37.28 |
| 12 | Dementia Tranquilla . . | 36.40 | 36.33 | 36.35 | 36.35 | 36.07 | 36.04 | 36.27 | 36.24 | 36.25 | 36.47 | 36.85 |
| 6 | Imbecility and Idiocy . . | 36.38 | 36.53 | 36.38 | 36.48 | 36.10 | 36.25 | 36.29 | 36.42 | 36.35 | 36.60 | 37.00 |
| 7 | Progressive Paralysis . . | 36.68 | 36.61 | 36.70 | 36.78 | 36.51 | 36.54 | 36.63 | 36.64 | 36.63 | 37.10 | 37.46 |

LIST B.—AVERAGES IN WOMEN.

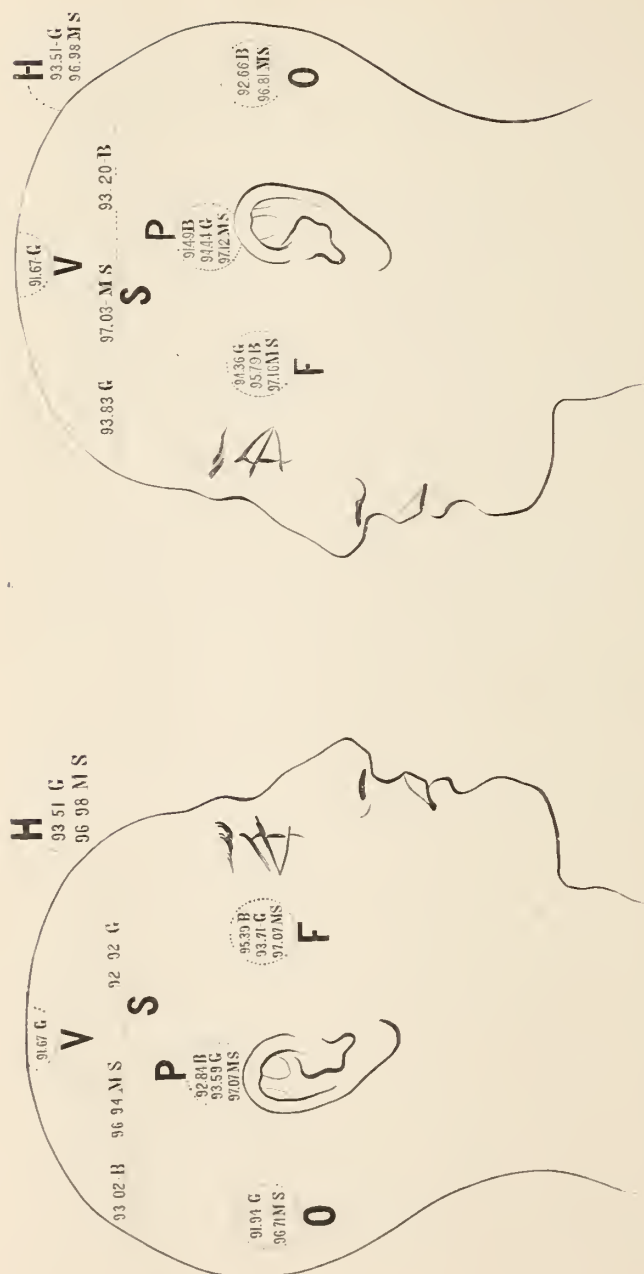
| No. of Pat's. | Form of Disease. | Frontal Region. | | Parietal Region. | | Occipital Region. | | Half the Head. | | Entire Head. | Axilla. | Rectum. |
|---------------|-----------------------------|-----------------|-------|------------------|-------|-------------------|-------|----------------|-------|--------------|---------|---------|
| | | LT. | RT. | LT. | RT. | LT. | RT. | LT. | RT. | | | |
| 12 | Furious Mania | 36.96 | 36.95 | 36.97 | 36.92 | 36.70 | 36.67 | 36.88 | 36.84 | 36.86 | 37.29 | 37.63 |
| 6 | Simple Mania | 36.43 | 36.36 | 36.26 | 36.25 | 36.18 | 36.13 | 36.29 | 36.24 | 36.26 | 36.93 | 37.20 |
| 8 | Lypemania Agitata | 36.86 | 36.97 | 36.07 | 36.88 | 36.51 | 36.60 | 36.81 | 36.82 | 36.81 | 37.32 | 37.62 |
| 10 | Lypemania Simplex | 36.33 | 36.40 | 36.29 | 36.17 | 35.98 | 35.92 | 36.20 | 36.16 | 36.18 | 36.76 | 37.21 |
| 5 | Dementia Agitata | 36.68 | 36.68 | 36.56 | 36.64 | 36.28 | 36.20 | 36.50 | 36.50 | 36.50 | 37.10 | 37.40 |
| 11 | Dementia Tranquilla . . . | 36.02 | 36.01 | 35.87 | 35.81 | 35.56 | 35.48 | 35.82 | 35.77 | 35.79 | 36.66 | 37.07 |
| 5 | Imbecility and Idiocy . . . | 36.40 | 36.36 | 36.38 | 36.44 | 36.16 | 36.26 | 36.32 | 36.35 | 36.33 | 36.93 | 37.16 |

LIST C.—AVERAGE OF MALES AND FEMALES.

| No. of Pat's. | Form of Disease. | Frontal Region. | | Parietal Region. | | Occipital Region. | | Median Front'l Reg. | Median Pariet'l Reg. | Median Occip'l Reg. | Half the Head. | | Entire Head. | Axilla. | Rectum. |
|---------------|------------------------|-----------------|-------|------------------|-------|-------------------|-------|---------------------|----------------------|---------------------|----------------|-------|--------------|---------|---------|
| | | LT. | RT. | LT. | RT. | LT. | RT. | | | | LT. | RT. | | | |
| 18 | Furious Mania. | 37.02 | 36.99 | 36.97 | 36.92 | 36.74 | 36.71 | 37.00 | 36.94 | 36.72 | 36.90 | 36.87 | 36.89 | 37.21 | 37.62 |
| 12 | Simple Mania. | 36.46 | 36.47 | 36.35 | 36.31 | 36.13 | 36.10 | 36.47 | 36.33 | 36.11 | 36.31 | 36.29 | 36.30 | 36.70 | 37.10 |
| 8 | Lypemania Agitata. | 36.86 | 36.97 | 37.07 | 36.88 | 36.51 | 36.60 | 36.92 | 36.97 | 36.55 | 36.81 | 36.82 | 36.81 | 37.32 | 37.62 |
| 26 | Simple Lypemania. | 36.33 | 36.34 | 36.25 | 36.22 | 35.94 | 35.97 | 36.34 | 36.23 | 35.96 | 36.17 | 36.17 | 36.17 | 36.56 | 36.97 |
| 10 | Dementia Agitata. | 36.55 | 36.55 | 36.54 | 36.55 | 36.27 | 36.26 | 36.55 | 36.55 | 36.27 | 36.45 | 36.45 | 36.45 | 36.99 | 37.34 |
| 23 | Dementia Tranquilla. | 36.22 | 36.18 | 36.12 | 36.10 | 35.83 | 35.77 | 36.20 | 36.11 | 35.80 | 36.05 | 36.01 | 36.03 | 36.56 | 36.96 |
| 11 | Imbecility and Idiocy. | 36.40 | 36.45 | 36.38 | 36.46 | 36.11 | 36.25 | 36.43 | 36.42 | 36.18 | 36.29 | 36.38 | 36.34 | 36.63 | 37.08 |
| 7 | Progressive Paralysis. | 36.68 | 36.61 | 36.70 | 36.78 | 36.51 | 36.54 | 36.65 | 36.74 | 36.53 | 36.63 | 36.64 | 36.63 | 37.10 | 37.46 |

We have thought it might prove useful to observers to have for handy reference, a summary of the normal temperatures of the head as determined by Broca, Gray, Maragliano and Seppili, and have placed the figures upon the two following diagrams.

Rivista sperimentale di freniatria e di medicina legale, etc., 1879, Reggio-Emilia. [. . .]



Catgut as a Carrier of Infection. Prof. ZWEIFEL, of Erlangen, recently met with a case which led him to the conclusion that catgut might be the unsuspected source of infection. He operated on a vesico-vaginal fistula which was so small that it could only be seen by forcing milk through it, using catgut for the suture. The patient was taken on the twelfth day following with all the symptoms of pyæmia, and died on the twenty-second day. The autopsy showed that the source of the infection was in the pelvis and it could only have been absorbed by the small freshened surface around the fistula. As all the instruments used in the operation had been soaked in a 5 per cent. solution of carbolic acid, the catgut was suspected as the source of infection. This suspicion was strengthened by reading in a foreign journal an account of an operation for ovariectomy in which catgut was used and where everything had gone on quite easily and satisfactorily at the time of the operation but had resulted fatally from septic infection notwithstanding the careful carrying out of the antiseptic method. He therefore caused the catgut to be examined microscopically, and found portions of it filled with bacteria. As he was about to do an ovariectomy, he ordered the catgut to be previously examined. Small pieces were cut off and unrolled in the same carbolic oil in which they had been preserved. They also were found to be swarming with the same pests. Fresh and clean catgut was therefore chosen, and carefully examined by the microscope before being used. The operation succeeded perfectly. The professor is certain that had the other specimen been employed, death would have resulted.

He thinks the decomposition of the catgut must have taken place in the original filling of the bottle, or possibly afterwards, from the evaporation of the volatile carbolic acid. This he thinks more likely than that the catgut was originally made of foul material. He insists that all catgut should be examined by a competent microscopist before being used in order to make sure of its purity.—*Centralblatt für Gynäkol.*, No. 12, 1879.

[M. D. M.]

Perforation of the Walls of the Uterus by the Uterine Sound.

Dr. C. LIEBMANN, of Triest, has observed two cases of perforation of the uterus by the sound, without bad results. The first patient had born children and was perfectly healthy. The perforation was made four times and the sound carried up as far as the umbilicus. There was a slight resistance when the sound

passed the fundus and a little blood followed. The patient remained perfectly well.

The second case was a nullipara. The fundus was very tender and the sound was accidentally shoved through. The temperature rose to 38.9°, but the next day the patient was entirely well.

These cases led Dr. L. to make a series of interesting experiments on the bodies of 100 women. The experiments were very carefully made and the results are related.

In 23 cases, perforation of the uterus was *very easy*, and in 42 cases it was *easy*; in none of these cases had post mortem softening taken place. All of these cases had died of phthisis, that being the principal cause of death in the author's hospital.

The cases in which the perforation was made with difficulty, were all women who had borne children. In 78 cases the fundus was perforated in the neighborhood of the tubes. Fifteen times the anterior or posterior wall and once the anterior wall directly over the internal os. The author gives a very complete review of the literature of the subject. He discards entirely the idea of catheterization of the tubes.

Aside from softening of the walls from local diseases or sub-involution, he gives two special factors as favoring the occurrence of the accident.

1. Certain alterations in the uterus brought on by the general condition of the individual. 2. Diminished mobility of the uterus from peri-uterine affections. In the first he mentions atrophy and tuberculosis of the uterus, carcinoma of the body and myomata so situated as to cause atrophy of one part of the organ, or a marked œdema. In the second he names consumptive diseases, senile marasmus, premature atrophy in a result of prolonged nursing, tuberculosis, and disturbances of circulation from heart disease.

Particularly important is the observation of the ease with which a uterus partially or wholly fixed can be perforated. The accident is particularly likely to happen in attempting to replace by the sound a uterus wholly or partially fixed. He declares that the cases of bad results or sudden death from peritonitis following the sounding of the uterus, are due to a perforation not diagnosed.—*Centratlb. für Gynäkol.*, No. 12, 1879, p. 303.

[M. D. M.]

Nitrite of Amyl in Uterine Hæmorrhage. Elias W. Kern, M.B., reports that he was led to its use by a paper of Koehler in *Allg. Med. Central Zeitung*, No. 1, 1879, quoted in *Brit. Med. Jour.*, Feb. 1, 1879, in which it was recommended in several cases of uterine hæmorrhage that warm fomentations be applied to the head to prevent anæmia of the brain and also of the heart. By this treatment Dr. Koehler had saved patients in the most dangerous cases of hæmorrhage.

It occurred to Dr. Kern, while in attendance upon a case of post partem hæmorrhage, the patient being in a state of collapse, to use nitrite of amyl by inhalation. He did so with most satisfactory results. The hæmorrhage ceased at once and permanently, and the patient was restored from a state of collapse.—*Brit. Med. Journal*, Nov. 1, 1879.

[McB.]

ORIGINAL OBSERVATIONS.

A GUMMY TUMOR OF THE PONS AND CRUS, WITH DISSEMINATED CORTICAL AND BULBAR LESIONS, CAUSING PARALYSIS OF THE RIGHT THIRD NERVE, TRIGEMINAL NEURALGIA AND EPILEPSY.*

By R. W. AMIDON, M.D.

The patient, a widow, thirty-three years of age, born in Germany, came under notice May 7, 1878. Her inheritance was good. She had had no miscarriages. She had just lost a child, three and a-half years old, with some head trouble.

Menstruation had ceased at the age of thirty-one. At that time, two years ago, continuous neuralgia began in the distribution of the supra- and infra-orbital branches of both fifth nerves.

This region was marked out by the patient as including all the face above a line running back from the corner of the mouth to the posterior edge of the ramus of the jaw, and all in front of a line running from this point vertically to the scalp.

She never had any pain in the chin and lower part of the cheek (region of mental), or in the parotid region or over the temporal muscle (region of auriculo-temporal). This pain was worse at night and in dark weather. Anorexia, constipation and occasional vomiting were also present.

The patient has, during the last two years, had several epileptic attacks, preceded several minutes by a nasal aura.

She describes this aura as a peculiar smell, but can compare it to nothing.

She says that the cheeks and other neuralgic parts often become extremely red.

* Case under the care of Dr. W. H. Draper in the New York Hospital.

On examination, the patient is seen to be anæmic, and the skin covering the whole neuralgic area is strongly pigmented, giving it a light coffee-colored look. She is very stupid. The pelvic contents are normal.

Being put upon Blaud's and aloes and mastich pills, a new symptom was developed, viz., partial dysphagia.

May 12th.—The patient had an epileptic fit with nasal aura, after which she slept soundly. 310 cc. of urine, which contained hyaline casts and but 2.8 grams of urea.

May 14th.—Urine for 24 hours 248 cc., containing only 66 per cent. of urea. It was now noticed that the neuralgic surface was hyperæsthetic, and that the right pupil was smaller than the left.

May 20th.—The patient had a fit, with twitching of face and left side of the body.

May 30th.—The patient had four fits, with twitching of face and right side of the body.

May 31st.—Patient had two fits.

June 4th.—A severe headache had now set in. Paresis of the right third nerve was now first noticed.

June 6th.—Paresis well marked. Slight ptosis, dilatation of the pupil and some external strabismus on the right side. The patient has diplopia.

June 16th.—The patient has almost continuous headache, complete third nerve palsy, and to-day one convulsion.

June 21st.—The patient is very stupid and hard to arouse. There is no aphasia or anæsthesia.

The anorexia, vomiting and constipation continue; articulation and deglutition are slow and difficult, and there is retention and involuntary evacuation of urine and involuntary defecation.

The pulse and respiration are slow; there is no fever, and the extremities are cold.

June 27th.—The fundus of the eye was normal. The patient was put upon mercury by inunction, and iodide of potassium .60 tid.

July 7th.—Much improved.

August 28th.—Discharged cured.

The patient, having no treatment outside, gradually relapsed, and three months after her discharge was re-admitted in a still worse condition than at first. The patient now was in a typhoid condition. She was extremely stupid, recognized no one, and only answered questions by yes and no. There was complete right

third nerve palsy, extremities were cold, and there was a bed-sore on the right foot. The breath was very offensive, tongue coated, gums very red, bleeding, ulcerated, and covered with sordes.

Oct. 26th.—The patient's left arm and leg are colder than her right. She was put on iodide and bromide of potassium, each 1.30 tid. She grew worse; bed-sores formed on all exposed points, the respiration became rapid and stertorous, the left side became very cold, and all pulsation was extinguished on that side before the right, and death ensued November 3d, at 10.29 A.M., the pulse being distinguishable in the right femoral *only* for seven hours before death, and cardiac movements ceasing completely one minute before cessation of respiratory movements.

Death was preceded by convulsive movements of the right arm and leg.

The autopsy, 24 hours after death, revealed adhesions between the liver and diaphragm, the remains of an old perihepatitis; liver small, capsule thickened on convexity, and deeply fissured. The aorta was slightly atheromatous. There were slight adhesions at both pulmonary apices. The left kidney weighed 110 gm., the right 100 gm., both with slightly adherent capsule, irregular surface and rather pale cortex.

The cerebral arteries appeared thickened, and the pia mater was opaque, especially at the base. A conical tumor, about 2 cm. long, took the place of the right third nerve. The tumor seems continuous with the basilar artery, whose coats are very much thickened.

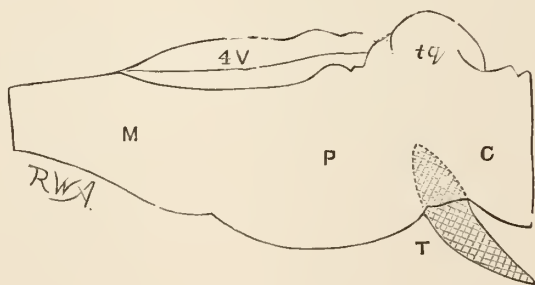


FIG. 1.—DIAGRAM TO SHOW THE LOCATION OF THE TUMOR.—M, Medulla; P, pons; C, crus; tq, tubercular quadrigemina; 4 V, fourth ventricle; T, tumor.

On section the tumor has a pinkish-gray translucent look. It

extends into the substance of the pons and inner part of the right crus cerebri. There were hard, yellowish deposits in the cortex at the base of each fissure of Sylvius, and in each anterior perforated space, surrounded by a grayish, translucent zone of tissue.

The inferior surface of the cerebellum was adherent to the subjacent medulla (4th ventricle), and when separated from it left some cerebellar tissue attached. There was a deposit of new tissue on the posterior surface of the medulla, especially marked at the apex of the fourth ventricle.

A microscopic examination of the kidneys showed the epithelium of the tubules swollen and abnormally granular.

The tumor of the third nerve consisted of closely-packed, round and spindle cells of small size, having large granular nuclei and very little, if any, intercellular substance. (See Fig. 2, t.) At

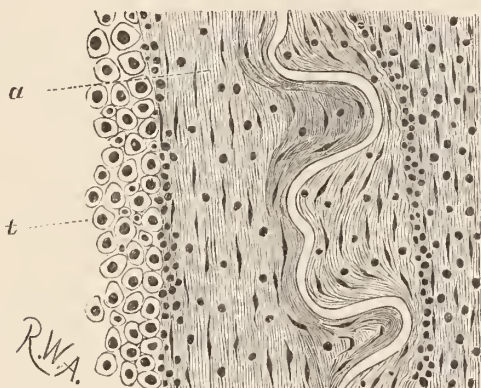


FIG. 2.—TRANSVERSE SECTION OF THE WALL OF THE BASILAR ARTERY.—*t* tumor tissul; *a*, adventitia, internal to which are seen the media and intima.

certain points there are round, thick collections of cells and numerous nuclei, presenting almost the appearance of a miliary abscess. In the centre of the tumor few blood vessels are seen, but at the periphery they are extremely numerous, small and dilated. There is no line of demarcation about the tumor, but it gradually shades off into the nervous tissue which here is largely infiltrated by new cells.

The capillaries in the tumor are dilated, tortuous and stuffed with red blood corpuscles. Outside the capillaries are seen scattered collections of migrated white blood corpuscles. The larger vessels present changes which have been demonstrated by Heubner and others, and thought to be characteristic of specific arteri-

tis. These changes consist in hypertrophy of the intima and adventitia, and infiltration of all the coats, especially the outer by new cells. The perivascular space everywhere contains numerous migrated cells, which in some places completely block it, distend it, and compress the contained blood vessel, with its already narrowed lumen. The perivascular exudation often contains newly-formed capillaries.

The coats of the basilar artery are much thickened, and show marked cell-infiltration of especially the outer coat, which seems continuous with the tumor tissue.

The changes in the medulla exist chiefly in the hypoglossal and spinal accessory district, *i.e.*, about the apex of the fourth ventricle.

The pia mater over the posterior surface of the medulla is thickened and vascular, adherent on the one hand to the cerebellum and on the other to the medulla, whose border at this point is infiltrated with new cells. This cellular infiltration, which occupies chiefly the posterior and lateral regions of the medulla, is generally very diffuse, but at certain points the new cells are aggregated together into an opaque mass.

The infiltrated regions comprise the ventricular floor, and the nuclei of the hypoglossal and spinal accessory.

The posterior pyramids and restiform bodies are also implicated. In sections all along here the origin of the ascending branch of the sensory root of the fifth nerve contains a great number of new cells, giving the tissue a dense, opaque look.

Vascular lesions are very marked in the medulla at this point. They consist, besides the capillary engorgement, chiefly of infiltration of the adventitia and stuffing of the perivascular space with new cells. When the accumulation around a vessel is regular and small in amount, it causes the artery to present the appearance of an epithelial tube; when the migration into the perivascular space has occurred at intervals, it gives rise to fusiform enlargements on the vessels, resembling aneurisms. The vascular changes are most marked in the median line under the apex of the fourth ventricle.

The lower facial and olivary nuclei seem tolerably free from deposit, as does indeed the entire anterior half of the medulla at this point.

Higher in the medulla, at the origin of the glossopharyngeal nerve, gross changes are confined to the lateral region of the medulla, and still higher, in the medulla and pons, only minor vascular lesions are found.

The pia mater at the base, and especially at the commencement of the fissure of Sylvius, shows an abundance of new cells in its meshes, and around some of the arteries miliary collections of cells have taken place. The small vessels of the pia generally are pretty healthy. In both anterior perforated spaces and between some of the small convolutions at the base of the fissure of Sylvius, the thickened pia and blood vessels dipping in with the surrounding metamorphosed cortical substance, form several roundish masses, in structure resembling the tumor.

Some collections of young cells apart from the vessels occur here in the cortical substance and anterior perforated space.

The vascular changes here are the same as already described.

Considering the tumor as an outgrowth from the diseased basilar artery, all the lesions are primarily vascular. The new formations, at first vascular, become non-vascular by continued migration and proliferation of the new cells in the perivascular spaces, causing progressive narrowing of the lumen of the contained artery. The collections of new cells about the small vessels of the pia mater are too diffuse and ill-defined to be mistaken for tubercles.

What seemed particularly interesting points about the case were :

1st. Had the deposit in the anterior perforated spaces any connection with the olfactory aura ?

2d. Does not the fact that a lesion was found in the lower sensory origin of the trigeminus, in a case of neuralgia of its supra- and infra-orbital branches, point to the medulla as the remote origin of these branches ?

CASE OF MOVABLE KIDNEYS: REMARKABLE VOLUNTARY CONTROL OVER THESE ORGANS.

By E. C. SEGUIN, M.D.

Mrs. V., an American, aged about 31 years, consulted me on October 7, 1879, for "nervousness" which had lasted eight or ten years. On examination I found that she was hysterical, debilitated, dyspeptic, and that her uterus was moderately anteflexed and anteverted. Her last child was born four years ago. In the succeeding year, three years ago, she suffered for a whole winter from repeated attacks of severe hepatic colic, vomiting and subsequent jaundice ; a few gall-stones were seen in the fæces.

In the course of her detailed story Mrs. V. mentioned that some time after these attacks of colic, she had noticed "lumps" in her abdomen, and that they have been present ever since, making their appearance and moving about under her control. One physician had told her that these lumps were "muscle," another that it was "the liver." They had never caused her any pain.

Examination of the abdomen in the recumbent posture showed a slim built body, but little covered with fat; simple palpation showed nothing abnormal, deep pressure in the left side of the abdomen just below the ribs, revealed an obscure sensation of a rounded solid body. The patient now brought down her kidneys. By a powerful expiratory effort, drawing the lower ribs downward and inward, thus compressing the upper part of the abdominal contents, the organs made their appearance under the hand, and could be felt and grasped. They were globular, firm, not tender. The left kidney presented at a point distant 7 cm. from the median line, and about on a level with the umbilicus, or half way between the lower border of the ribs and the crest of the ilium. The right kidney escaped from under the lower border of the liver, and presented at a distance of 9 cm. from the median line; not descending much below the edge of the liver. Upon the cessation of the expiratory effort the organs disappeared from these locations. The left kidney is much more movable than the right.

The other organs of the abdomen seem quite normal in size and position. The urinary secretion has always been free—too free often.

The interesting points in the case are :

1. The occurrence of double dislocation of the kidneys.
2. The ability of the patient to make the loosened organs descend and present under the anterior abdominal walls.
3. The probable ætiology, through the strong muscular efforts attendant upon hepatic colic.

I may add that statements relative to the uterine and renal displacements were corroborated by my friend, Dr. Paul F. Mundé.

